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Canadian International Makes Good Showing

Report for 1930 Shows Net Revenue Available for Interest and Depreciation Amounted to $5,724,726, Compared With $5,934,185 In 1929—Revenues From News Print Operations Were Larger, But Bleached Sulphite Pulp Revenue Declined—Additions to Fixed Properties and Working Capital Amounted to $3,667,730

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 29, 1931—A good showing is made by the 1930 report of the Canadian International Paper Company, according to which net revenue available for interest and depreciation amounted to $5,724,726, as compared with $5,934,185 in 1929. After deducting depreciation earnings for 1930 available for interest amounted to $4,230,147, or over 2⅔ times the interest requirements on all of the company's first mortgage bonds and prior liens. Revenues from the news print operations of the company were larger in 1930 than in 1929, but this improvement was offset by lower revenues from the bleached sulphite pulp mills.

For the first five months of this year, the company's earnings, after making the deductions for the five months in connection with the recently announced news print price cut, are approximately equal to the earnings for the corresponding period in 1930, the decrease in selling price being offset by the substantial reduction in production costs and in overhead expense.

Net additions to fixed properties and working capital during 1930 amounted to $3,667,730. Funded debt was decreased $637,020 through action of sinking funds and small maturities. Funds for these purposes were obtained from current earnings. At the end of the year, current assets amounted to $19,692,606, or almost three times current liabilities of $6,974,424, including open account indebtedness to International Paper Company amounting to $4,831,052. The company had no bank loans.

All of the stock and debentures of Canadian International Paper Company are owned or controlled by International Paper Company. Due to this close association, Canadian International Paper Company is able to maintain a fairly high rate of news print production even in periods of declining consumption as International Paper Company concentrates its operations in its mills in Canada where costs are lowest, and curtails correspondingly its operations in its higher cost United States mills.

Price Bros.' $800,000 Action

Price Bros. & Co., of Quebec, have won the first round in the action it has taken for $800,000 damages against nine other news print manufacturers. The defendants submitted a motion challenging the jurisdiction of the Quebec courts in the matter, but the motion has been dismissed, the court sustaining the argument and counsel for the plaintiffs that as their headquarters are in Quebec the case should be heard in Quebec. The action arises out of the alleged breaking of an agreement relating to the pooling of tonnage by members of the Newsprint Institute of Canada. The companies affected by the ruling are: J. R. Booth Ltd., E. B. Eddy Company, Bathurst Power and Paper Company, Beaverwood Fibre Company, Thunder Bay Paper Company, Fort Frances Pulp and Paper Company, Kenora Paper Mills Company, Great Lakes Paper Company, Abitibi Power and Paper Company.

Fraser Co.'s Activities

It is reported that the management of Fraser Companies, Ltd., of Edmundston, N. B., have succeeded in placing the activities of the organization on a sounder basis, and is now bending every effort to straighten out the company's fiscal position so that the capital structure may more truly reflect earning power. The Restigouche pulp mill, completed last year, is operating at full capacity and the quality of its products is showing marked betterment from month to month. The company's catalog paper mill at Madawaska is operating at approximately 80 per cent of capacity and board mills are running full. The bond mill is operating somewhat short of full capacity.

Since the beginning of the current year steps have been taken to liquidate the company's large lumber stocks. The market, however, continues unsatisfactory. Shipment of Soviet lumber to the English market has curtailed exports from the Maritimes, while the American market has not shown the usual seasonable improvement.

Wood operations last winter were kept down to a minimum. The cut of logs was especially limited, though a fair-sized pulpwood cut was made.

New Treaty with Australia

Much satisfaction is expressed here at the fact that a new trade treaty between Canada and Australia has been signed by representatives of both countries. Publication of the treaty will probably take place in July, delay being agreed upon so that it may be published simultaneously in the two Dominions.

Philadelphia Paper Market Is More Buoyant

Buyer's Market Predicted for Late Summer, With Increased Demand and Higher Prices—Standard Grades of Fine Paper Are Seasonally Quiet At Present—Summer Specialties Are In Excellent Request, Due to Warmer Weather

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., June 29, 1931.—Though the summer lull has set in for the paper trade locally, there is a more optimistic attitude taken by distributors towards the future. It is believed that by late summer a buyers market for the paper industry will witness higher prices and more steady demand. From present indications the paper trade is assured that prices will soon be advanced. There is almost certainty that the prices of kraft will be the first adjustment in the paper list, as already dealers are looking forward to higher quotations in the coming month. Another commodity that may be advanced is news print, which has been steady for some time. While the converters of kraft bags were informed in the past ten days that kraft for this purpose has been advanced to the consumers as well as to the distributors, the prices of bags have held. However with the rise in kraft passed along to the converters it is believed that prices of bags will also be advanced shortly following a five per cent rise last month. The advance prices to converters is one-fourth cent per pound.

Fine paper dealers are less active and have been handling sparse shipments of hand to mouth type, as might be expected with the duller trend of summertime. The demand for social stationery has also shown a quieter trend with the advent of vacation days and the winding up of the school and social season. There has been steadier sales of greeting card and bristol boards, while book papers of the bulkier grades are holding fairly well. Wrapping papers are dull. Summer specialties continue in good demand, with soda fountain supplies, waxed and parchment papers, and sanitary supplies consumed more freely in hot weather, moving in good volume. Towels and cups were moved in heavy shipments in the sudden burst of hot weather that came with the week-end and dealers were caught short owing to cautiousness in stocking. Dealers are more inclined to listen to manufacturers these days regarding stocking owing to the belief that prices are about to rise and the more steady influence of reduced production and clearing of mill stocks over the past six months.

Gypsum Ships Start Summer Traffic

Supplying gypsum to the U. S. Gypsum Company's plant at 58th street and the Schuylkill River, the Gypsum Packet Company, which carries chiefly cargoes of gypsum on its return from Nova Scotia, has announced a summer schedule of three days connection between the northern country and Philadelphia that became effective last Sunday. As in previous summers, the Gypsum company will carry passengers as well as freight on its four steamers to the Land of Evangeline, making its stopping point at Windsor.

Allen E. Whiting Returns

Allen E. Whiting, president of the Whiting Patterson Company, Inc., 320 North 13th street, who has been spending the past two months on a ranch in Wyoming, where his son John R. Whiting, has been living the past six months, has returned to his desk.

John M. Driver Co.'s Progress

Following several months perfection of plant equipment and the installation of units for manufacture and printing of cellophane wraps and bags, the John M. Driver Company Division of Milprint Products Corporation, 57th street and Lancaster Avenue, is now running on a full line of these products for merchandise and food coverings. The firm is equipped to do color printing on cellophane and is producing small and large sacks, as well as a variety of wraps. There are also produced cartons with cellophane combination. The Driver Company Division of the Milprint Corporation of Milwaukee was taken over by that concern a year ago and its advertising and display carton and wrap departments augmented in enlarged quarters.

Krafelt Corp. Producing Insulation Papers

David Lindsay Jr., who is well known in the Quaker City trade as a former president of the Philadelphia Paper Trade Association, member of the Lindsay Paper Company, and associate in the old Keystone Paper Mills, is now head of the Krafelt Corporation, Wilmington, Del., and is engaged in the manufacture of a line of insulation paper of the heavier grades.

S. D. Warren Co.'s Additions

The latest additions in the lines of the S. D. Warren Paper Company, fine grades, are now stocked by the Philadelphia distributors, the Charles Beck Paper Company and the D. L. Ward Company, both located in the Terminal Commerce Building. They are the Warren Cumberland Dull Book and the Cumberland and Dull Post Card, which are produced in white and ivory. Another late addition to the Warren papers is the New Lustro in Brilliant dull and white only.

Allen G. Center With Continental Paper Co.

Return of Allen G. Center to the management of the reopened Philadelphia branch office of the Continental Paper Company, of Richfield Park, N. J., was effective with the month. Mr. Center for ten years prior to the closing of all branches, under the economy plans of the Continental company two years ago, was manager of the local offices and in the interim has been representing the Chesapeake Paper Board Company, of Baltimore, Md. He announces that the Continental Paper Company is now operating its mills on 100 per cent electrical power and has been facilitated in increasing the quality of its box board because of the uniform speed of output. The re-opened offices of the Continental company are located on the 7th floor of the Terminal Commerce Building, Broad and Race streets.

DeJonge Co. Covers Additional Territory

Philadelphia offices of the Louis DeJonge Company, in the North American Building, will add to the distributive sales territory of the Pennsylvania State trade that formerly was covered directly from New York. The Philadelphia, Baltimore, Washington, and Camden, territories were the previous sections covered by the local staff. E. P. Joseph has been assigned to cover the Pennsylvania trade under the Quaker City manager, William Bollenbach. The DeJonge Philadelphia offices distribute box maker's papers and book binders supplies, while the Bentley Paper Company, with R. Peel Bentley at its helm in the Public

Ledger Building represents the printing paper division in this section.

National Bag & Paper Co., Inc., Acquires Plant

The National Bag and Paper Company, Inc., has acquired the former plant and business of the Central Paper Bag Manufacturing Company, located at 1732 North Blair street, and is continuing to produce a general line of flat and square bags in standard grades and in glassines. These are also made in special sizes, plain and printed. The officials of the new concern are President Joseph Burkhart, Vice President and Treasurer Harry Hand, Secretary Frank S. Scanlon. Others connected with the firm are Joseph Mullen and Eugene Deitrich.

Kardon Bros. Continue Bag Business

Having been connected with the old Central Paper Bag Manufacturing Company, at 1732 North Blair street, founded by their father, Harris Kardon, the younger generation of that family, and brothers, Jacob and Manuel Kardon, have formed the firm of Kardon Bros., and will continue to manufacture these commodities at the old original factory of the Kardon company, 114 South 2nd street, where their parent began business more than 25 years ago. The Kardon Bros. will continue to produce a general line of printed and plain sacks and bags. Harris Kardon, founder of the business, has retired from the industry, and turned his interests over to his sons.

Hinde & Dauch Sales Advance

While May sales of the Hinde & Dauch Paper Company, in the Philadelphia territory, with local offices in the Drexel Bldg., show a substantial increase, while June demands have continued to hold. The sales were chiefly advanced in the container division, where the demands of the paint and rayon industries showed a steady volume of business, while other industries didn't hold to normal proportions. However, the demands of the paint manufacturing and rayon trades offset in their advances the slower pace of other lines, and brought volume above last year.

Thomas McDonald, is now covering Pennsylvania for the Hinde and Dauch company, while George Barringer is covering his old ground in New Jersey. Previously associated with the Gloucester, N. J., mills of the company, Mr. Barringer is now linked with the Quaker City offices.

Leuretta Porter, of Japan Paper Staff, Married

Leuretta Porter, who is secretary to Warwick C. Miller, manager of the Philadelphia offices of the Japan Paper Company, Witherspoon Building, was married to William H. Casey, at the Church of the Holy Child, and is now on a honeymoon in Atlantic City. She will return to her duties at the Japan offices this week.

Charles McDowell Back From Yachting Trip

Charles McDowell, head of the McDowell Paper Mills, Manayunk has returned from a trip along the shores and waters of the Chesapeake Bay in the vicinity of Chesterton, Md.

Unloading Pulp for Union Bag

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., June 29, 1931—A large force of workmen are now busy at the barge canal terminal in Fort Edward unloading two large consignments of pulp for the Union Bag and Paper Company in this village. Only recently the company started using the waterway in receiving its pulp shipments and motor trucks are used in the transportation to the mills. Up to a few months ago most of the pulp used by the local concern was ordered from mills at Tacoma, Wash., and the railroads were used in the final stages of these shipments.

A. W. Nickerson Joins Robert Gair Co.

Arno W. Nickerson, who has been prominent in process development in the paper industry for a period of years, has joined the research and products development department of the Robert Gair Company, 420 Lexington Avenue, New York City.

Since his graduation as a chemical engineer from the University of Maine in 1916, Mr. Nickerson has been active in process development work and as a consultant in the paper and pulp industry. For most of this period he was treasurer and director of Process Engineers Inc. of 501 Fifth Avenue and of Process Engineers Ltd. of Canada. His work in the development of processes and practice in the manufacture of pulp and paper has taken him into virtually every important mill both in the United States and Canada.

During the war, Mr. Nickerson served with the special development division of the Chemical Warfare Service and for some time he acted as technical consultant to chemical companies supplying the paper industry.

The research and products development department of the Robert Gair Company of which J. D. Malcolmson, formerly of the Mellon Institute, is manager, concerns itself with the development of new products and new uses and is in general charge of maintaining the quality of fabricated products made by the company. Among its more recent and more important developments are new moisture proof boards, grease proof coatings for boxboard, window cartons, waterproof gummed tape for sealing corrugated containers and a variety of new designs and shapes of paper boxes. In addition, the department is constantly at work on new improvements in raw materials, packages and package designs with a view to anticipating future requirements.

Indianapolis Demand Inactive

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., June 29, 1931—Little change is seen here in paper demand. The summer lull for most lines has set in but the merchants generally feel it will be no worse than it was last year. And there are some who believe volume during the summer months will show a gradual expansion into the fall season. If this comes about the trade will enter the fall season in better shape than last year. It is pointed out that no prospects are seen now for any further drastic price cuts and this fact alone should steady the market considerably.

It is predicted that book and cover papers will enter the fall season in good shape as far as price and demand is concerned. It is believed the fall business in these lines will be considerably better than a year ago. At the present time there is not so much demand due entirely to seasonal conditions. News print demand is spotted. In some sections the papers seem to be able to keep their advertising up to a point where their papers have about the same number of pages as they have had during most of the year, but there are other sections where business has dropped off considerably. This is said to be particularly true in those cities which publish large Sunday papers. These companies are finding it extremely difficult to keep the Sunday editions up to the former size.

The last week or so has seen a little increase in demand for building and roofing paper. While the total volume for the state is not large it is more than likely the summer demand will be slightly better than last year.

Demand for glassines continues dull. There appears to be no safe foundation for the market. Buying is only for immediate consumption.

Ontario Fine Paper Operation Near Capacity

Multiplicity of Small Orders Keeps Machines Fairly Well Employed — Demand for Book, Bond, Ledger and Writing Papers Brisk—Under Adverse Market Conditions, Coarse Paper Manufacturers Are Only Operating Lightly

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., June 29, 1931—Rather spotty conditions continue in both the wholesale and manufacturing ends of the paper industry in Ontario, although comparatively little complaint is heard in the matter of total volume sales. With general business conditions unsettled, however, there is an inclination toward cautious buying and in small lots. In the manufacturing field mills have a multiplicity of small orders sufficient to keep the machines operating fairly close to capacity as far as the fine paper section is concerned. On the other hand the coarse paper section is operating lightly under adverse market conditions. In a number of instances fine paper mills have about a week's orders ahead and this condition has existed for some time, particularly in respect to book papers.

Most of the mills report quite a fair demand for books, bonds, ledgers and writings, considering the light volume of business generally throughout the Province and there is little disposition to complain of the situation as it exists in the holiday season now being entered upon. One of the big Ontario mills manufacturing a variety of fine papers states that there has been a distinct improvement during the past two weeks and that they are now finding it much easier to keep the machines fed with small-sized orders, the total of which, from week to week, assumes satisfactory proportions.

There has been some improvement, too, in the sales of coated stock, while manufacturers of glassine, grease proof, and waxing papers are gradually increasing their output. There has been little improvement in the paper converting trade and envelope and stationery manufacturers could handle a good deal more business than is coming their way. The light weight paper mills have improved their position and the market in tissues and toilets is much better in respect of foreign importations, which now have little affect on the local market. The box board market is still quiet, with the mills operating far from capacity, and the paper box industry is passing through a quiet season.

Pulpwood Operators Want U. S. Market

Return of the United States market for Canadian pulpwood can be secured, in the opinion of J. W. Lalonde, prominent pulpwood operator of Sturgeon Falls, Ont., provided freight rates remain equal for both Russian and Canadian wood, and further, if some security is given to the United States mills that there would be no embargo placed against them. "Our wood at one time found a ready market in the United States," he said, "but to the dismay of many, the jobbers have been notified that they will not receive any contracts the coming season. Canadian pulpwood is superior to the pulpwood shipped from Russia, although many false statements to the contrary have been circulated. However, we admit that Russian pulpwood is better prepared than most Canadian wood. The jobbers of pulpwood shipped to the United States mills have been educating the farmers, settlers and woodsmen that their wood must be better prepared to compete with the Russian threat, with the result that this year the preparation of pulpwood is superior to that of any other time in the history of the industry. But the preparation of pulpwood is not primarily the cause of the depression of today.

"For more than thirty years Canada has supplied the United States mills with wood, and if our wood is not of the highest quality we could not have held this market. We can now remember that for the past many years there has been a cry through the public press, in the streets and on the platforms, and in some corners of our Parliament that the United States is cleaning our country of the choicest wood, robbing the forests, and emperilling our greatest basic industry. These sources have been shouting that the only method to save the situation is placing an embargo on the exports of our wood. . . . How many mills today in Canada are purchasing wood from the farmers and settlers? The result of this cry is obvious; United States mills having been always confronted and threatened did what was only natural in finding another market in Russia. That country gladly disposed of her wood, thankful to find a ready market in the United States. This is the great reason why we are having competition from Russia today. The return of this great Canadian industry could be accomplished, provided the freight rates remain equal for both Russian and Canadian wood, and further, if some security were given to the United States mills that there would be no embargo placed against them."

Ground Wood Mill at Soo Reopens

W. H. Smith, assistant managing director of the Abitibi Power and Paper Company, announced this week that the Abitibi ground wood mill at Sault Ste. Marie, Ont., where pulp is treated by mechanical process, would reopen immediately, giving employment to approximately 75 men. This mill has been closed since February last. Mr. Smith, when asked if he had any statement to make regarding the Sturgeon Falls situation, which, in common with other news print manufacturing centers, is undergoing a crisis, said that the company is now concentrating all its efforts toward giving relief by reopening the plant there. According to Mr. Smith, the Sault mill has a good chance to continue operations indefinitely, if the weather remains favorable and orders continue. "At any rate work is assured for three months," said Mr. Smith. "We are glad to get a chance to run, and even the employment of 75 men is good news." The Hon. William Finlayson, Minister of Lands and Forests, also had official news from Alexander Smith, president of the Abitibi company, whose headquarters are in New York City, that the ground wood plant at Sault Ste. Marie would reopen.

Work on Schedule at the Canyon

L. R. Wilson, vice-president of the Ontario Power Service Corporation, has returned from an inspection trip to the Abitibi Canyon, where the Abitibi Power and Paper Company is engaged in the construction of 275,000 h.p. hydro-electric development. On his investigation tour Mr. Wilson was accompanied by George F. Hardy, of New York, designing engineer in charge of construction, and his assistant, T. T. Whittier. Since his return to New York, Mr. Hardy has reviewed the entire situation, and revised his estimate of cost in the light of the experience to date, and states that no conditions have developed in the progress so far made to cause him to doubt the completion of the project by October 1, 1932, or to believe that

his original construction cost estimated will be exceeded. Unusually favorable conditions of river flow this spring are being experienced and the work is fully up to schedule.

Preference Dividend Deferred by Abitibi

Reflecting the trying times being experienced by producers of news print and pulp, directors of Abitibi Power and Paper Company meeting in Toronto deferred the dividend due July 1 on the company's 6 per cent. cumulative preferred issue. The dividend on the smaller 7 per cent. issue was declared a short time ago. Unofficial reports for some time have intimated that in addition to some of the mills being closed, business has been slightly worse for those still in operation. The total amount of 6 per cent preferred authorized is $50,000,000, of which $34,881,800 has been issued. The 7 per cent issue, also cumulative, totals $1,000,000.

Notes and Jottings of the Trade

George Carruthers, president of Interlake Tissue Mills, Ltd., has returned to Toronto after a trip through the Canadian West to the Pacific Coast. Although the West has been hard hit, said Mr. Carruthers, there was a spirit of optimism prevailing that seemed bound to carry the western provinces through the present trying period. As far as present conditions in the light weight market goes he stated that he found them closer to normal than he had expected.

Arthur Jewett, of Provincial Paper, Ltd., Toronto, has returned from a business trip to Winnipeg, covering most of the journey by automobile. Welcome rains in the Sault Ste. Marie, Ont., district, have halted rather serious bush fires in that vicinity which threatened to destroy a considerable expanse of pulpwood.

George Carruthers, Jr., son of George Carruthers, president of the Interlake Tissue Mills, was married a few days ago to Miss Black, a popular young lady of St. Catherines, Ont., and has been receiving the congratulations of many in the Ontario paper trade.

Directors of the Interlake Tissue Mills, Ltd., met at the head office in Toronto a few days ago and declared the usual quarterly dividend.

Louis F. Dow, Ltd., of Winnipeg, Man., manufacturers of advertising specialties, such as calendars, greeting cards and novelties, are establishing their executive offices and principal factory in Toronto, retaining their Winnipeg plant for branch production. They have leased 10,000 square feet of space at 285 King street East and will install necessary machinery and equipment at once. About fifteen workers will be engaged at the start and the firm will be in production by August 1.

Miami Valley Superintendents Meet

DAYTON, Ohio, June 29, 1931.—B. M. Baxter, of Grand Rapids, Mich., discussed the subject of "Beaters" at the regular meeting of the Miami Valley division of the American Paper and Pulp Mill Superintendents' Association at the Manchester hotel in Middletown, June 20.

Considering the hot weather and conditions generally, and the fact that a big meeting had been conducted in this city by the superintendents only a short time ago, the attendance was good.

Mr. Baxter, consulting engineer of wide reputation, illustrated his lecture which proved of unquestioned interest to the craft.

Middletown members of the Miami Valley division were royally entertained by the Middletown paper contingent.

Boston Paper Trade Happenings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., June 29, 1931—F. S. Webster Company, manufacturers of carbon copy paper and typewriter ribbons, formerly of 332 to 336 Congress street, have opened their new five-story factory and office building at 1 to 23 Amherst street, Kendall Square, Cambridge, Mass.

Charles W. Fields, vice-president of Baird & Bartlett Company, box board merchants, has returned from a week-end trip to his cottage on Newfound Lake, New Hampshire.

J. Harry Ellis, merchandising manager of the wrapping paper department of Carter Rice Co. Corp., has gone to Harwich, Mass., for a vacation, expecting to return July 6.

Walter H. Brown, formerly of the American Woolen Company, has taken a position on the sales staff of D. F. Munroe Company, wrapping paper and twine merchants.

Percy D. Wells, dealer in fine paper, has returned from a week's vacation at Kennebunkport, Me.

H. H. Rutter, treasurer of Rutter & McNaught, Inc., has returned from a week's business trip to Maine.

The Monadnock Paper Mills, Bennington, N. H., have brought out Transit Ledger, a new ledger paper of improved texture and strength.

Hungerford & Terry, Inc., manufacturers of filters and water softeners, of Clayton, N. J., announce that D. R. Weedon, who has been connected with them in their Boston office for four years, has severed his connection. H. R. Myers, for the past six years chief engineer of the company, has taken charge of the New England territory to continue the company's past service to their many New England customers. The Boston office will remain at 53 State street, Room 440.

Talc Mining in New York

[FROM OUR REGULAR CORRESPONDENT]

GOUVERNEUR, N. Y., June 29, 1931—The W. H. Loomis Talc Corporation, of this place, has just issued an interesting booklet which gives a brief description of the talc mining industry in Northern New York. Talc is now used extensively for paper manufacturing and various other uses. In describing this product the pamphlet points out that it is distinctly fibrous, the fibers when insulated resembling a ground wood fiber or asbestos. The discovery of the mineral in Northern New York is credited to C. S. Meritt in 1873 and from that time the commercial use of the product has steadily gained importance until at the present time both here and abroad it is claimed that industry it utilizing approximately 75,000 tons of talc yearly. The mineral is used in various degrees of fineness and certain processes were orginated by W. H. Loomis, president of the company.

Reforestation Plans

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., June 29, 1931—The reforestation program mapped out this year by the State Conservation Department calling for the planting of 15,000,000 trees within an area of 15,000 acres of land is rapidly nearing completition, according to announcement made here. Latest reports from various sections indicate that about 7,735,443 trees have already been planted. Besides the state plantings orders have been received for 18,706,150 trees from counties, communities, organizations and private land owners. These plantings, incidentally, will require the utilizing of nearly 19,000 acres of land which will mean a total of 34,000 acres reforested this year if the entire program is carried out.

Continental to Introduce New Toilet Paper

Under Trade-Mark "Nap-O-Lin," High Grade Line Will Shortly Be Manufactured By Victory Bag & Paper Co. Branch At Marinette, Wis.—Converting Plant Being Supplied With Paper From Park Mill of Marinette & Menominee Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., June 29, 1931—Introduction of a high grade line of toilet paper under the trade-mark "Nap-O-Lin" will be made soon by the Victory Bag and Paper Company, of Marinette, Wis., a branch of the Continental Paper and Bag Corporation. The company expects to establish a countrywide distribution through retail outlets at an early date. Manufacture of bags was discontinued by the company in August, 1930, and the plant was changed over at that time to a tissue and towel converting plant. The paper is being supplied by the Marinette & Menominee Paper Company, another of the mills of the International Paper and Power Company. The Park mill, where the paper is being made, is running about 90 per cent of capacity. A national advertising campaign is in preparation for Nap-O-Lin and it is expected the demand will keep the two plants operating practically at capacity.

Activities of the International's three mills at Marinette, Wis., and Menominee, Mich., were given prominent mention in a special edition of the *Marinette Eagle-Star*, published last week in honor of the newspaper's sixtieth anniversary. The history of the founding of the mills in 1881 and 1891 is told, and their rapid progress related. The mills were acquired by the International, or its Continental bag subsidiary, a number of years ago, and have been centering production largely on kraft until the shift to tissue specialties was made. A. B. Hansen, who started with the company as a chemist, is the acting manager at the present time.

Badger Paper Mills Progress

Another article in the edition deals with the remarkable success of the Badger Paper Mills, Inc., located at Peshtigo, Wis., near by Marinette. The sulphite mill is operating at its capacity of 60 tons daily, and the paper mill at capacity with 50 tons daily. The number of employees is now 240. A converting department for wax paper specialties has helped the company considerably, and a nice line of trade is being built up in this branch, especially on bread wrappers ready printed for the market. The wax paper department takes up about one-third of the output of the Yankee machine. The Fourdrinier is now devoted to sulphite bond, plain, water-marked, mimeograph, ledger and drawing paper, using extensively of the bleached sulphite manufactured by the company. The mills have been placed in first class condition since the new company took them over from the mortgage holders of the Peshtigo Paper Company in February, 1929. E. A. Meyer, formerly vice-president and general manager of the Menasha Printing and Carton Company, Menasha, Wis., is president and general manager.

Arthur T. Brown Dead

Arthur Thomas Brown, treasurer and general manager of the Nicolet Paper Company, DePere, Wis., died June 19 at his home at DePere. He had been ill for several months and complications hastened the end. Mr. Brown was 43 years of age. His career in the paper industry started at the Kimberly-Clark Corporation's mill at Niagara, Wis., where he spent ten years after completing his schooling. He then went to the Rhinelander Paper Company, Rhinelander, Wis., as office manager. In 1927 he came to DePere as assistant manager of the Nicolet Paper Companw when the new corporation was organized to purchase the American Writing Paper Company's mill there. He was an earnest worker and his knowledge of the paper industry made him so valuable that he was promoted to general manager in 1930 when a reorganization of the original company took place. At that time he was elected a director and treasurer of the organization. His widow and three children survive him.

All Appleton Mills Operating

All mills at Appleton, Wis., are operating, although some are on a 4-day week schedule temporarily, according to reports of the United States Employment Service. One mill has increased its working force, the report says. Conditions in Appleton are the most favorable of any of the sixteen cities reporting, with allied industries also doing well. There is still a widespread surplus of labor throughout the state, but the paper mill districts are generally in good shape.

Consolidated Wins Suit

Attempts to make the Consolidated Water Power and Paper Company purchase a farm on the Wisconsin River near Plover, Wis., from the Federal Land Bank of St. Paul, Minn., were thwarted by the court. The bank brought suit to force the company to condemn a 360-acre farm and buy it because of the claim that the farm had been damaged by water backing up from the company's dam at Biron. The jury held that no part of the farm was damaged and the verdict therefore went to the Consolidated Company.

To Study River Pollution

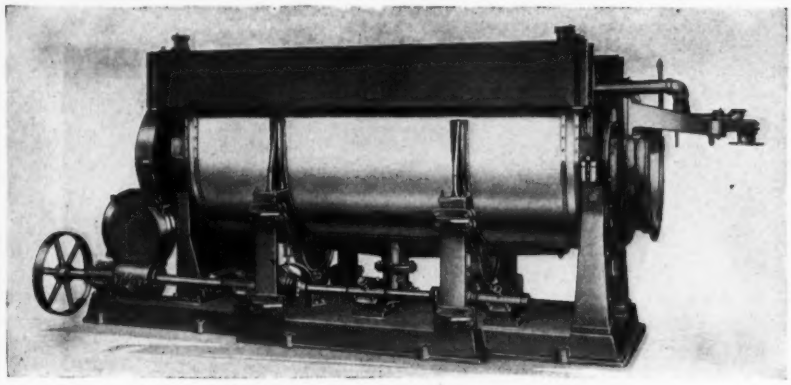
Further studies will be made this summer by the State Sanitary Engineering Department of Wisconsin relative to river pollution and its effects. The work will again be in charge of Dr. A. E. Cole, Professor of Biology at the University of Louisville. Dr. Cole found in his work last summer that sulphite waste discharged by Wisconsin paper mills does not poison fish in ordinary dilutions, but does cause their death by depleting the free oxygen present in the water.

Kenneth Lawson Files Petition

A voluntary petition in bankruptcy has been filed by Kenneth Lawson, Menasha, Wis., who has been manufacturing paper roll plugs for a number of years. He did a large business with mills everywhere. Mr. Lawson lists liabilities of $54,995 and assets of $23,655. He asks exemption of $14,684.

Appleton Coated Paper Co. Get Clay

Appleton Coated Paper Company, Appleton, Wis., received a shipload of China clay direct from Norway last week. The cargo of 420 tons was brought over from the old country aboard the Norwegian tramp steamer, *Bommestad*. The ship docked at Milwaukee, where the cargo was transferred for rail shipment to Appleton.



the Easiest Way *to make* Better Paper

In many mills, a slight addition to Bird Screen capacity has resulted in much cleaner, much better paper, at insignificant cost. Let us work with you. Bird Screens may be your quickest and most economical way to improve quality.

BIRD MACHINERY

BIRD MACHINE COMPANY

South Walpole ◢◤ Massachusetts

4918

New York Trade Jottings

J. N. Stephenson, editor of the *Pulp and Paper Magazine of Canada*, and his wife and two sons, were New York visitors last week.

* * *

Robert P. Wolf, manager of the sulphite pulp mill of the Weyerhaeuser Timber Company, at Longview, Wash., is a New York visitor this week.

* * *

The Committee on Stock List of the New York Stock Exchange has approved for trading 199,500 shares of common stock of the Lily-Tulip Cup Corporation, without nominal or par value.

* * *

Frederic C. Clark, vice-president of Skinner & Sherman, Inc., chemists and engineers, 246 Stuart street, Boston, Mass., and his wife, have been visiting New York during the past week.

* * *

Members of the New York Employing Printers Association and their friends will inspect the Ticonderoga Pulp and Paper Company's mills and also visit historic Fort Ticonderoga during their two-day pleasure trip on July 20-22.

* * *

Cement-Gun Construction Company, engineers and builders, of Chicago, Ill., have removed their New York offices from the Grand Central Terminal to 1169-1171 Woolworth Building. The new telephone number is Worth 2-5798.

* * *

Solid Container Corporation, manufacturers of paper products, have been incorporated under the laws of the State of New York with a capital stock of $20,000. Barnett & Greenbaum, 50 Court street, Brooklyn, N. Y., are the attorneys.

* * *

Volume VII of Rex Brasher's monumental illustrated work, "Birds and Trees of North America," has just been published and may be seen at the offices of Royal S. Kellogg, secretary of the News Print Service Bureau, 342 Madison Avenue, New York.

* * *

Michael Madigan and Henry J. W. Dort have severed their connections with the old established house of Wilkinson Bros, & Co., to join the Franklin Paper and Twine Corporation, of 126 Bleecker street, New York. Mr. Madigan had been connected with Wilkinson Bros. & Co., for more than a quarter of a century and Mr. Dort for more than sixteen years. Both gentlemen possess a host of friends in the paper and twine industries.

Another Attempt To Sell Paper Company

DENVER, Col., June 27, 1931.—Judge E. V. Holland of the Denver district court, into whose hands the state supreme court transferred the receivership handling of the Colorado Pulp and Paper Company of Denver, has appointed Fred D. Stackhouse, clerk of the court as special master for the sale of the company. Stackhouse must advertise for bids for sixty days and as Judge Holland has instructions from the supreme court to straighten out the tangle and sell the property it is likely that the deal will go through this time. Receiver Beck was ordered to return to the company's treasury $12,500 he collected as fees, but which the supreme court ruled were exorbitant.

Trade Mark Department

CONDUCTED BY NATIONAL TRADE-MARK CO., WASHINGTON, D. C.

The following are trade mark applications pertinent to the paper field pending in the United States Patent Office, which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade Mark Company, 900 F street, N. W., Washington, D. C., trademark specialists. As an additional service feature to its readers, PAPER TRADE JOURNAL gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering.

DAIN TEA. Ser. No. 304,628. Package Paper Company, Holyoke, Mass. For lace reproductions on transparent paper or paper substitutions and used as table coverings.

Representation of a globe surrounded by stars. Ser. No. 303,228. United States Envelope Co., Springfield, Mass. For writing printing, ledger, record, envelope, book cover papers, bristol board, tissue, etc.

SPEE-D-FORM. Ser. No. 303,500. Philip Hano Co., Inc., Holyoke, Mass. For manifold books, fan-fold and printed rolls, loose-leaf sheets, bills of lading, etc.

BONWOVE MIMEO. Ser. No. 308,595. Rockwell Barnes Company, Chicago. For writing paper.

THERM-A-CARRIER. Ser. No. 309,082. Iowa Can Company, Keokuk, Ia. For corrugated board containers for ice-cream packages, etc.

CELESTIAL. Ser. No. 309,312. Kimberly-Clark Corporation, Neenah, Wis. For cover papers.

PERMAFLEX. Ser. No. 309,614. Hall & McChesney, Inc., Syracuse, N. J. For indexes for books.

TORONTO. Ser. No. 309,875. Tonawanda Paper Company, Inc., North Tonawanda, N. Y., and Wilmington, Del. For news print paper.

SOUTHLAND, and picture of a ram. Ser. No. 309,885. Continental Paper and Bag Corporation, New York City. For food wrappers of paper.

SPEEDIGRAPH. Ser. No. 309,954. American Sales Book Company, Ltd., Toronto, Ontario, Canada, and Niagara Falls and Elmira, N. Y. For paper and stationery—sales books, manifolding books and manifolding sheets.

PERMACEL. Ser. No. 310,048. The Eaton Paper Company, Adams, Mass. For writing paper.

BLANCOTE. Ser. No. 310,169. Industrial Chemical Sales Company, Inc., New York. For chemical preparations for coating and filling paper.

CLEAROTO. Ser. No. 310,255. International Paper Company, New York City. For paper used in the printing art.

SUPEROTO. Ser. No. 310,256. International Paper Company, New York City. For paper used in the printing art.

EVEN-RITE. Ser. No. 310,280. Joseph Berg, New York. For check book, account books, and ledger books.

REX-TEX. Ser. No. 310,213. The Cooke & Cobb Company, Brooklyn, N. Y. For expanding paper filing devices for holding letters, documents, and the like.

TROJAN BLU-KORE. Ser. No. 309,587. The Gummed Products Company, Troy, Ohio. For gummed paper and fabric tapes.

PRIMO. Ser. No. 309,680. Harry Elish Paper Company, New York City. For gummed paper.

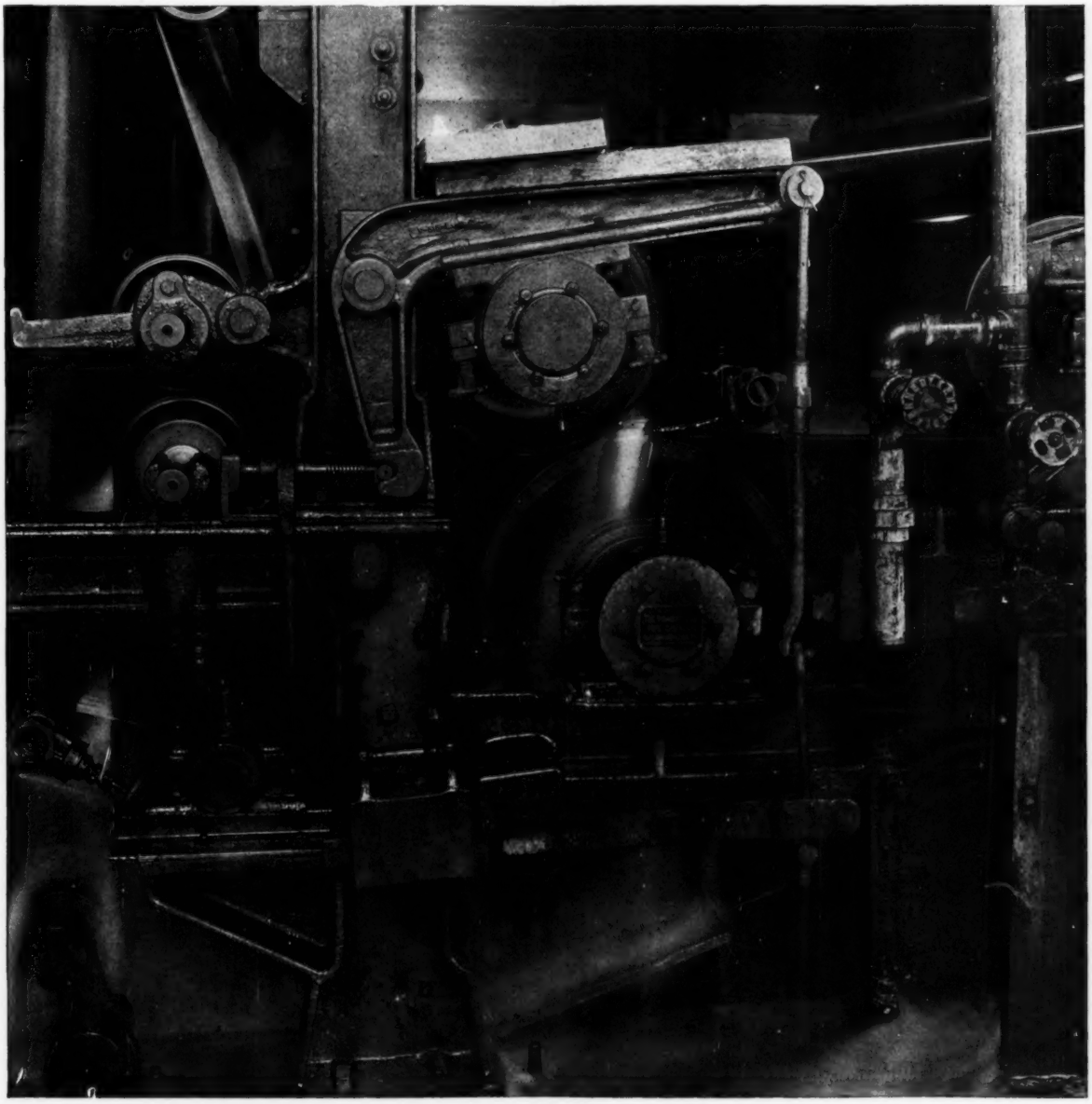
OAK BROOK. Ser No. 312,510. Butler Paper Corporation, Chicago, Ill. For paper—namely, book paper cover paper, document paper, bristol cardboard, bond paper, writing paper, ledger paper, and paper for the making of envelopes.

SCHOOLTEX. Ser. No. 312,881. Hopper Paper Company, Taylorville, Ill. For writing paper.

KRALO. Ser. No. 312,941. Beecher-Peck & Lewis, Detroit, Mich. For paper for wrapping meats.

Something NEW for BOARD MILLS

What could you save by removing 1½ to 2 tons of water per ton of board before the board reaches the press part of your machine? We can prove that this is actually accomplished in mills using the Downingtown Extractor Roll, a new device for board machines. Other advantages are that it increases speed, saves power, saves steam, widens trim, eliminates suction boxes on bottom felt, increases life of bottom felt, stops felt picking, improves finish and firmness of sheet, increases bulk of sheet and improves pop test. For further information address the Downingtown Manufacturing Company, Downingtown, Penna.



Pulp and Paper Mill Equipment

Armco Spiral Welded Pipe

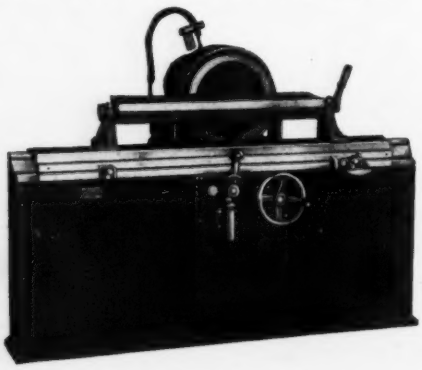
The American Rolling Mill Company has just published an attractive handbook on Armco Spiral Welded Pipe, which contains specific information helpful to the user of specially designed pipe requiring a range of diameters from six to twenty-four inches, and a variety of wall thicknesses.

It describes the spiral welding process and the economies to be derived by using this product; it contains size, weight, and pressure tables; it discusses the various types of coatings, couplings, joints, fittings, and flanges; there are also tables for converting pounds pressure per square inch into feet head of water, and vice versa, information on car loadings, and complete specifications for spiral welded pipe.

This book contains forty pages, 8½ x 11 inches, and is profusely illustrated. Copies may be obtained by addressing the American Rolling Mill Company, Middletown, Ohio.

New Knife Grinder

A new development in the low priced grinder field has been announced, viz., the new Covel-Hanchett GK Grinder with cabinet base, ball bearing arbor, Hanchett Red Anchor cylinder grinding wheel, water attachments and full automatic operation, manufactured by the Covel-Hanchett Company, of Big Rapids, Mich. Important gains in accuracy, durability, range of work and convenience of operation are assured. These machines, in the smaller sizes, cover a range of service largely employed in pattern shops, planing mills, saw mills, flooring, implement, furniture, and other wood-working plants, car and body shops, and for hog, chipper, barker, tobacco or stone knives, and a great variety of miscellaneous grinding operations; and in the larger sizes for veneer and paper knives, shear blades, and other comparatively long unit grinding service.

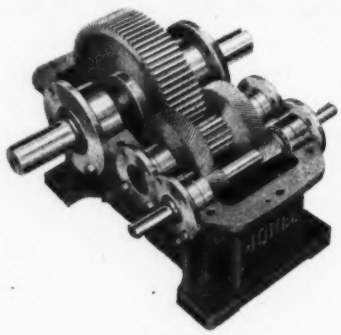


NEW LOW PRICED KNIFE GRINDER

Standard equipment includes a 12, 14 or 16 inch grinding wheel (according to capacity of machine) of the new Hanchett Red Anchor cylinder wheel type, which will save approximately 40 per cent in grinding wheel expense over the ordinary cup grinding wheel. All of the grinding element is used, no abrasive to throw away, as with an ordinary cup, disc, cylinder or segmental wheel. The new type grinding wheel alone provides one of the most important grinding economies in recent years. With this new (patented) grinding wheel development combined with an entirely new construction for low priced grinder service, very pronounced economies are now provided. Segmental wheel in all steel chuck is supplied when desired in place of the Red Anchor cylinder wheel.

Smaller Herringbone-Maag Speed Reducers

A new series of small Herringbone-Maag Speed Reducers has just been developed by the W. A. Jones Foundry and Machine Company, 4401 W. Roosevelt Road, Chicago, Ill. Capacities range up to 18 h.p. Reduction



NEW SPEED REDUCER

ratios 12 to 1 up to 48 to 1. The smallest reducer in this series is $20\frac{5}{16}$ inches long and 14¼ inches high. The base measures 10¼ inches wide.

For universal application all the reducers in this series have high and low speed shaft extensions on both sides. This eliminates the need of a right or left hand assembly. Two shaft guards are provided.

On the high speed side the Herringbone Gears, and high speed pinion teeth, are generated by rack-shaped cutters, with straight sides, used in precision gear planer. This is the simplest and most accurate method known for precise generation of herringbone gears. On the low speed side the Maag spur tooth form is used because of the greater strength needed at this point.

This combination makes an exceptionally efficient, quiet and economical method of reducing speed.

In this respect, as in all other ways, these reducers are small reproductions of the larger Jones Herringbone-Maag Reducers which have proven reliable for many years.

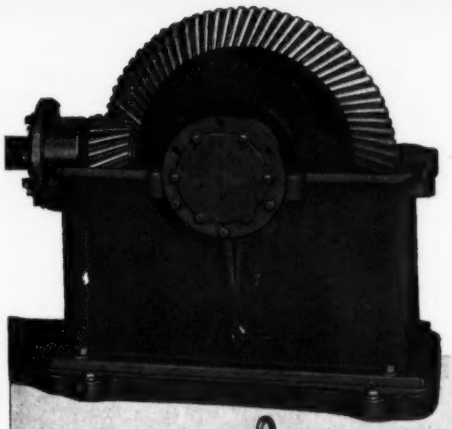
Wagner Furnace Catalog

Outstanding developments have been made in the last few years in the pulp and paper industry. Most of these have been due to the application of science as embodied in engineering and chemistry. An important development in the pulp and paper industry is the Wagner Furnace, making available to the pulp mill a method of recovery of chemical and heat from the sulphate or kraft and the soda process, and opening a way to eliminate stream polution, with recovery of heat values in the sulphite process.

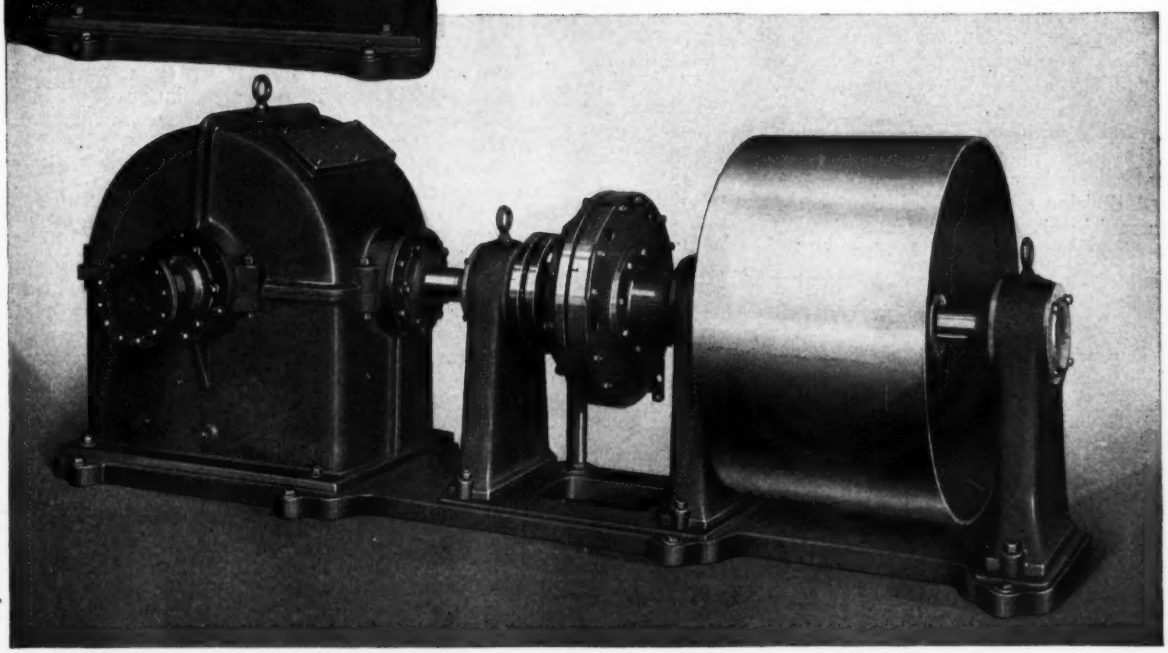
The Wagner Furnace is a vertical, stationary steel structure with a soapstone or other refractory lining, having a roof formed of boiler tubes and connected to a water-tube boiler, with induced draft fan and scrubber, or other device for removing the small amount of chemical carried out by the gases.

This unit which is almost identical in design for soda and sulphate, displaces in the soda process the rotary and

SPEED AND UNIFORMITY WITHOUT BACKLASH OR VIBRATION . . .



Anti-friction bearings. Unit mountings with positive shaft alignment. Magnetic or mechanical clutch. Remote control.



RICE, BARTON & FALES

INCORPORATED

WORCESTER, MASSACHUSETTS, U. S. A.

Paper Making Machinery Since 1837

fire pot, the ash conveying system and leachers; and, in the sulphate process, the disc evaporators, rotaries and smelters.

Its function is to burn the volatiles and fixed carbons securing absolute combustion, returning the chemicals for reuse in the most available form; doing, in an efficient manner without extra fuel, what is so poorly done by the rotary systems, and eliminating wastes, labor, dirt, smoke and odors.

The advantages offered by the Wagner Recovery Furnace were so quickly recognized by leading pulp mills that installations were made in rapid succession. In some sections of the country, it has been found that the Ross-Wagner Furnaces have completely paid for themselves in one year's operation and in any section of the country the installation of this improved system is completely justified.

Ross engineers offer the following method for computing the value of steam which would be generated from waste heat by the Ross-Wagner System in your mill; multiply your present steam cost per 1000 lbs. by ten; and the results will be steam value per ton of pulp. Ross-Wagner Furnaces are built, sold and serviced by the J. O. Ross Engineering Corporation. An attractive and illustrated catalog fully describing this modern recovery system will be sent to interested executives.

Insulating Firebrick

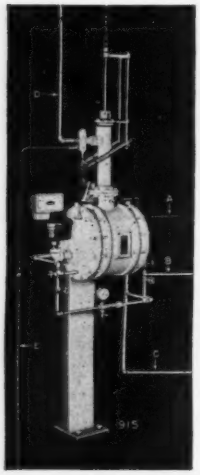
B. & W. No. 80 Insulating Firebrick is the subject of a new bulletin issued by The Babcock & Wilcox Company, 85 Liberty street, New York.

This publication discusses a new firebrick with insulating properties, an entirely new building material for furnace work, which, the Company states, has not only insulating qualities better than the majority of high quality insulators but refractory characteristics that compare favorably with any high grade firebrick. These characteristics are illustrated by means of curves and sketches and calculations.

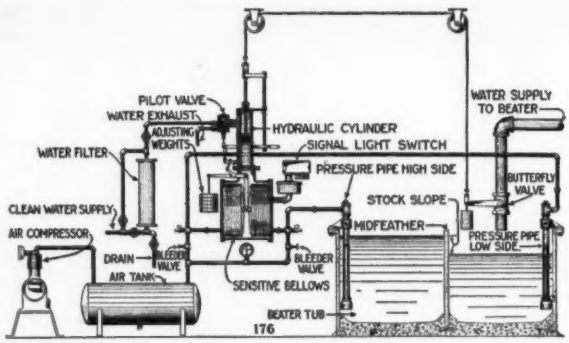
A division of the bulletin is devoted to the advantages secured by the use of this material. Examples are given to illustrate each point. Copies will be sent gratis.

New Automatic Water Feeder

Dependable control of stock consistency is assured by the use of the new Myers-Mesco Automatic Water Feeder, manufactured by the Merritt Engineering and Sales Company, Inc., of Lockport, New York. By substituting clock-work, which is accurate and reliable, for guess work, which is inaccurate and unreliable, an automatic control may easily simplify a whole process and standardize a product, at the same time it is saving labor and reducing costs.



The Myers-Mesco Automatic Water Feeder consists of a pair of air tight drums or bellows connected with the two stand pipes. The drums are mounted so that one opposes the other and any movement represents the difference in pressure existing in the stand pipes, which in turn represents the difference in stock levels. The differential movement of the bellows is not in itself of sufficient strength and amplitude to directly operate a water supply valve, but by means of a hydraulic cylinder, controlled by a pilot valve, which in turn is operated through suitable lever connection with the bellows, the necessary force and movement are relayed to the butterfly valve attached to the water supply pipe.



BEATING CYCLE

Clear water for operation of the hydraulic cylinder is assured by the Automatic Water Feeder and, where a plant does not possess a compressed air line, a small air compressor and tank are included in the installation and maintain a constant supply of air to the stand pipes.

New Line of Clark Truclifts

The demand in industry for a lifting type power truck of adequate capacity, with four wheel steer and rear wheel drive, on which the steering wheels can be turned to a sharp angle enabling the operator to enter a freight car and spot his load at the far end—a truck of this description powered for 24 hours continuous duty if necessary—this demand is responsible for the introduction of a new line of Clark Truclifts.

A locomotive type cast steel frame, full floating rear axle of excess capacity, powerful hydraulic lifting mechanism with automatic control and a tractor type gas engine with engine speed governed to less than 1400 r.p.m. are features that are claimed to insure long life and uninterrupted service. The acceleration under load is a distinctive feature. One model has a narrow platform to accommodate U. S. Standard 12 inches under-clearance skid platforms. It lifts a 3-ton load in 9 seconds and its turning radius of 94 inches makes it easy to turn the corner of two intersecting 64-inch aisles with ample clearance all around. This model with its pointed platform is especially designed for loading box cars.

A heavier model lifts 4 tons in 8 seconds, has a speed

CLARK TRUCLIFT

Note The Blade Mounting

——IT'S DIFFERENT

accessible

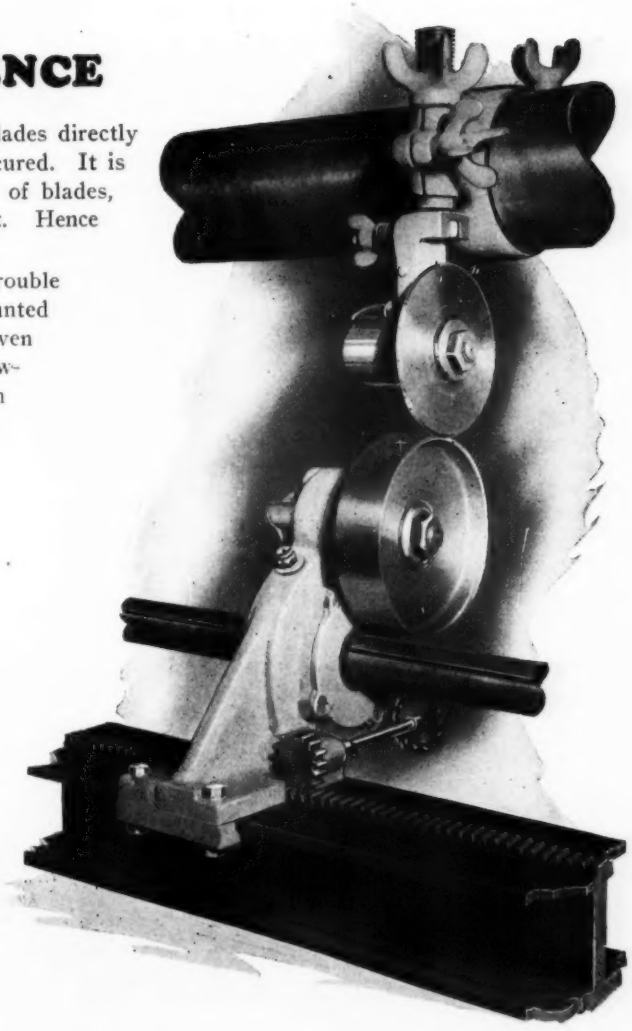
FOR YOUR CONVENIENCE

Under the usual arrangement of mounting bottom blades directly on shaft, a dull blade is more easily observed than cured. It is necessary to dismount shaft, and possibly a couple of blades, to replace a dull or nicked blade midway of shaft. Hence the tendency to postpone regrinding bottom blades.

In "M & W" Ball Bearing Slitters, these causes of trouble are avoided. The bottom blades, instead of being mounted directly on shaft, are mounted above it and gear-driven at three times shaft speed. This permits using slow-running, vibrationless shaft. Both drive shaft (which is splined) and slitter spindles run in annular ball bearings.

This gives a true-running, almost frictionless and wearless condition with minimum need for lubrication. Any bottom blade can be replaced in a moment or so, without disturbing shaft or any other blade merely by undoing end nut holding it on its shaft.

To complete the improvement, top blades also run in ball bearings. Thus the chance of frictional drag, and of wabble due to worn bearings, is eliminated. Any top blade is replaced, like any bottom blade, by removing one nut.



- **SAVES CLAIMS FROM PRINTERS DUE TO DUST AND BAD EDGES**
- **PREVENTS BLADE WABBLE THUS ELIMINATING SLITTER CRACKS**

EASY BLADE REMOVAL

Off and On In a Jiffy—Just Undo the Nut

THE MOORE & WHITE COMPANY

Established 1885

PAPER MACHINE BUILDERS

15TH ST. & LEHIGH AVE. PHILADELPHIA, PA.

of from 1 to 6 miles per hour and turns on a 94-inch radius.

In both models, maximum engine power is delivered to the two rear driving wheels through direct transmission. Special wide tires under platform are claimed to insure minimum tire wear. Utilization of gaspower is said to assure high fuel efficiency and makes the equipment capable of continuous day and night operation. These trucks are manufactured by the Clark Tructractor Company, Battle Creek, Mich.

Special Process Equipment

Special Process Equipment is the title of a new bulletin issued by The Babcock & Wilcox Company. This publication describes the fabrication of riveted and welded pressure vessels, tubular equipment, penstock piping, bends and forgings. All these products are illustrated by photographs and descriptions of typical installations.

A section of the booklet is devoted to a brief discussion of a new welding technique which, the Company states, produces welds equal to or better than the work metal in tensile strength, shock resistance, ductility and the ability to withstand repeated stresses. These characteristics are illustrated by photographs and descriptions of test specimens, macrographs, and photomicrographic studies.

The bulletin also discusses the production of alloy castings including the usual heat resisting alloys, the so-called stainless alloys, Nirosta KA2, high chrome-iron and intermediate alloys to resist corrosion and withstand high temperatures. Typical castings are illustrated. Copies of this publication may be had by addressing The Babcock & Wilcox Company, 85 Liberty street, New York, N. Y.

Installs Paper-Handling Railroad

Vastly increased efficiency has been achieved by the *Chicago Tribune* in warehousing its boat-delivered news print through the recent installation of a unique intra-warehouse railroad system.

The *Tribune's* warehouse fronts 1,034 feet on the Chicago river, and has a capacity of approximately 24,000 tons of news print. Boats from the *Tribune* paper millls at Thorold, Ont., pull up alongside the warehouse and are unloaded with specially-designed cranes. Formerly the news print rolls were transferred to their various storage places by a large crew of men using hand trucks.

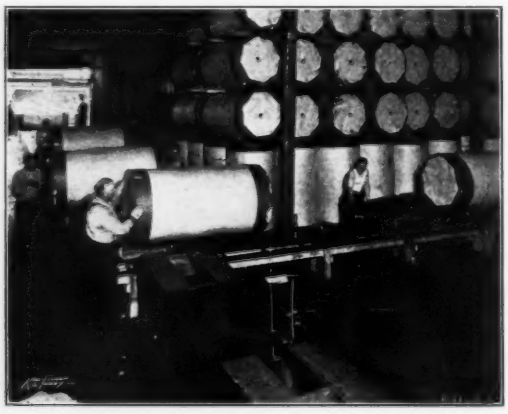


FIG. 1

LOADING END OF CHICAGO TRIBUNE NEW PAPER HANDLING RAILWAY. THE NEWSPRINT ROLLS DOWN THE PLATFORM TO WAITING TRUCKS AND THENCE DOWN THE TRACK BY GRAVITY THE FULL LENGTH OF THE WAREHOUSE.

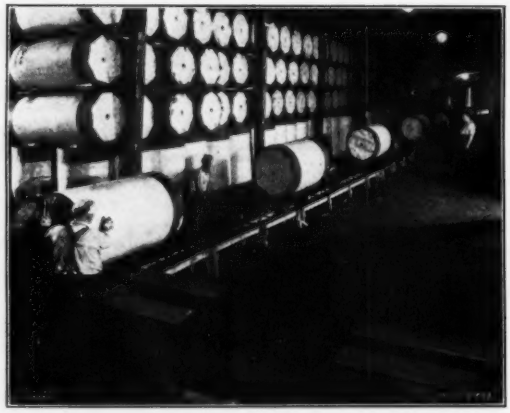


FIG. 2

NARROW GAUGE RAILROAD, WHICH ELIMINATES HAND TRUCKING IN CHICAGO TRIBUNE PAPER WAREHOUSE, IN ACTION.

A narrow gauge track running the length of the warehouse was completed about June 1. Small four-wheeled trucks built to accommodate a single roll now receive the paper and convey it speedily by gravity to the most distant points in the warehouse. Wooden platforms which meet the track at right angles permit the paper to be finally rolled into place. A portable tiering machine assists in stacking. Empty trucks return on a second track which is entered through an automatic switch. A spring bumper provides the initial impulse for the return trip, at the end of which the returning trucks are elevated into receiving position by a chain conveyor working on an incline.

The first track to be installed has a length of 480 feet. A second system, soon to be completed, will run the opposite length of the warehouse and will be 554 feet long.

The new system was designed and installed under the direction of Fred von der Horst, superintendent of the *Chicago Tribune* receiving department.

Combustion Steam Generator

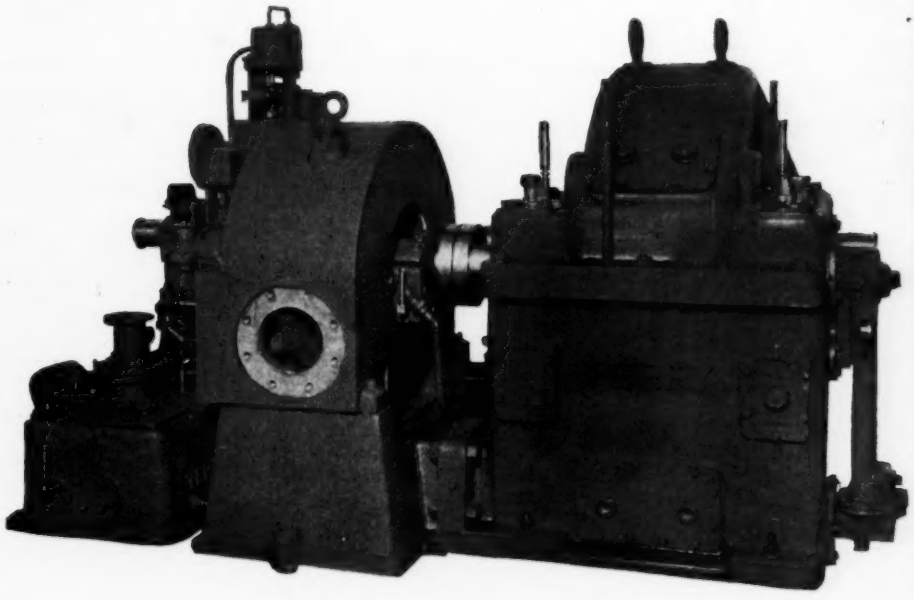
Combustion Engineering Corporation, 200 Madison avenue, New York, has just issued catalog SG-1, describing the Combustion Steam Generator, which is a single unit embodying in an integral design the several elements required in the production of steam. The purpose of this design is to so coordinate the functions of the various elements as to insure maximum efficiency with minimum operating and maintenance costs.

The Combustion Steam Generator is available in 8 standard sizes providing a wide range of capacities for any desired steam pressure and temperature. Pulverized fuel is introduced at the four corners of a completely water-cooled furnace and is burned with intense turbulent mixing action. The gases leaving the furnace pass through the superheater at the top of the furnace, thence through a bank of convection tubes and finally through a plate-type air preheater, to the chimney. A novel arrangement provides for regulating the temperature of the superheated steam under all conditions of operation.

Brown Potentiometer

A two-page circular, printed in three colors, has been published by The Brown Instrument Company, Philadelphia, featuring a new line of potentiometer pyrometers. The circular illustrates six outstanding features of this new instrument, together with an illustration of the single record recorder.

TERRY
Paper Machine Drive



400 H.P. Terry Paper Machine Drive. 6:1 speed range. Equipped with remote speed control.

TEN INSTALLATIONS
IN SIX YEARS FOR ONE COMPANY

In 1925 one of the country's largest paper manufacturers installed its first Terry Turbine Paper Machine Drive. The unit was so satisfactory and showed such a marked improvement over previous practice that two more units were shortly added.

Since then, as expansions have been made and new mills built, Terry units have been purchased exclusively. Today the ninth and tenth machines for this company are under construction.

A request on your letterhead will bring a description of these drives. Ask for bulletin S-89 or consult a Terry engineer.

The TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.
Steam Turbines - Gears - Shaft Couplings

T-1080

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Appleton, Wis.—The Fox River Paper Company, South Appleton street, has work nearing completion on extensions and improvements in Mill No. 3, to provide for increased capacity, and will have the unit ready for service at an early date. The work has been carried out by the C. R. Meyer & Sons Company, 50 State street, Oshkosh, Wis., general contractor.

Kingsport, Tenn.—Tennessee-Eastman Corporation is pushing construction on new addition to its local mill to be used for acetate cellulose production and expects to have the unit in operation towards the close of the year. It will cost close to $1,000,000, with machinery. It is said that this is the first of a number of large units to be constructed at the Kingsport mill and that expansion will be carried out at the rate of about $2,000,000 a year for the next few years until all cellulose and similar operations are concentrated at Kingsport. The company is a subsidiary of the Eastman Kodak Company, Rochester, N. Y.

St. Louis, Mo.—The Doane Carton Company, 912 North Market street, has completed plans and will soon begin construction of a new addition to carton and paper box-manufacturing plant, consisting of a one-story and basement structure, 60 x 80 feet, to cost about $25,000, with equipment. Contract for foundations and concrete superstructure has been let to the A. L. Rascher Construction Company, 4108 Clayton road. Clymonts & Heinicke, Wainwright Building, St. Louis, are architects.

Emeryville, Cal.—The Paraffine Companies, Inc., 475 Brannon street, San Francisco, are taking bids for steel sash and construction materials to be used in connection with expansion program at its local plant now under way, consisting of a one-story brick and steel structure to cost close to $60,000, with equipment. Leland Rosener, 233 Sansome street, San Francisco, is engineer in charge.

Kalamazoo, Mich.—The Western Board and Paper Company, Kalamazoo, operating a local mill, has secured permission from the Federal Court to dissolve the organization and the affairs of the company will be closed by Jay T. Bachelder, who has been acting as receiver. The mill was closed down permanently last August. The company has been operating at a loss for several years.

New Orleans, La.—The New Orleans Box Factory, Inc., recently organized by Lloyd J. Stone, New Orleans, and associates, is said to be planning the operation of a local plant for the manufacture of paper boxes and containers. The new company is capitalized at $20,000. Mr. Stone will be secretary. A. Angeletto is president.

Seattle, Wash.—The Lone Star Timber and Pulp Company, Seattle, is reported planning the construction of a new pulp and paper mill in the vicinity of Port Renfrew, B. C., where sites have been investigated. The proposed plant will consist of several units, including power house, machine shop and other mechanical departments, and is reported to cost over $1,500,000, with machinery.

New Haven, Conn.—The Clogston-Haskell Company, care of W. J. Clogston, 45 Sherland avenue, New Haven, recently organized by Mr. Clogston and associates with capital of $35,000, is said to be planning the operation of a new local plant for the manufacture of a line of paper boxes and containers. H. O. Haskell, New Haven, will be an official of the new company. R. A. Silverhale, 100 Church street, West Haven, is interested in the organization.

Clarksburg, W. Va.—The Ferguson-Merrells Corporation, Clarksburg, is said to have concluded arrangements for the purchase of the stationery manufacturing division of Auld's, Inc., Columbus, Ohio, and will remove to Clarksburg, where production will be continued and general expansion program carried out. The purchasing company has leased a portion of the building at 132 South Second street, and will occupy for the new branch of manufacture. Howard L. Robinson is president of the Ferguson-Merrells Corporation.

Chelsea, Mass.—The Russell Paper Can Company, recently formed by Harlow M. and S. V. Russell, 209 Highland street, Chelsea, and associates, with capital of 5000 shares of stock, no par value, is said to be planning the operation of a local factory for the manufacture of paper cans and other containers. Harlow M. Russell is president of the new company, and S. V. Russell, treasurer. Melvin H. Sidebotham is vice-president.

Springfield, Mo.—The Cassidy Box and Printing Company, Springfield, recently organized with a capital of $50,000, is said to be planning operation of a paper box and container manufacturing plant, and will begin work at an early date. James H. Cassidy, 313 East Water street, heads the company.

Sault Ste. Marie, Ont.—The Abitibi Power and Paper Company has arranged for the operation of its local ground wood pulp mill, closed for a number of weeks past, and will give employment to a working force of about 75 men until further notice. It is said that only two of the eight newsprint mills of the company are now in service.

Boston, Mass.—The New England Power Association, Worcester, Mass., a unit of the International Paper Company, 220 East 42nd street, New York, has concluded arrangements for a consolidation with the North Boston Lighting Properties, operating electric light and power utilities at Haverhill, Gloucester, Lawrence, Beverly, Salem and other cities in Massachusetts. The consolidated company will be known as the Massachusetts Power and Light Association, and will be affiliated with the International Hydro-Electric System of the International Paper Company. This system now includes 31 hydroelectric power plants and 9 steam-operated generating stations, with total installed capacity of 1,584,000 horsepower. The

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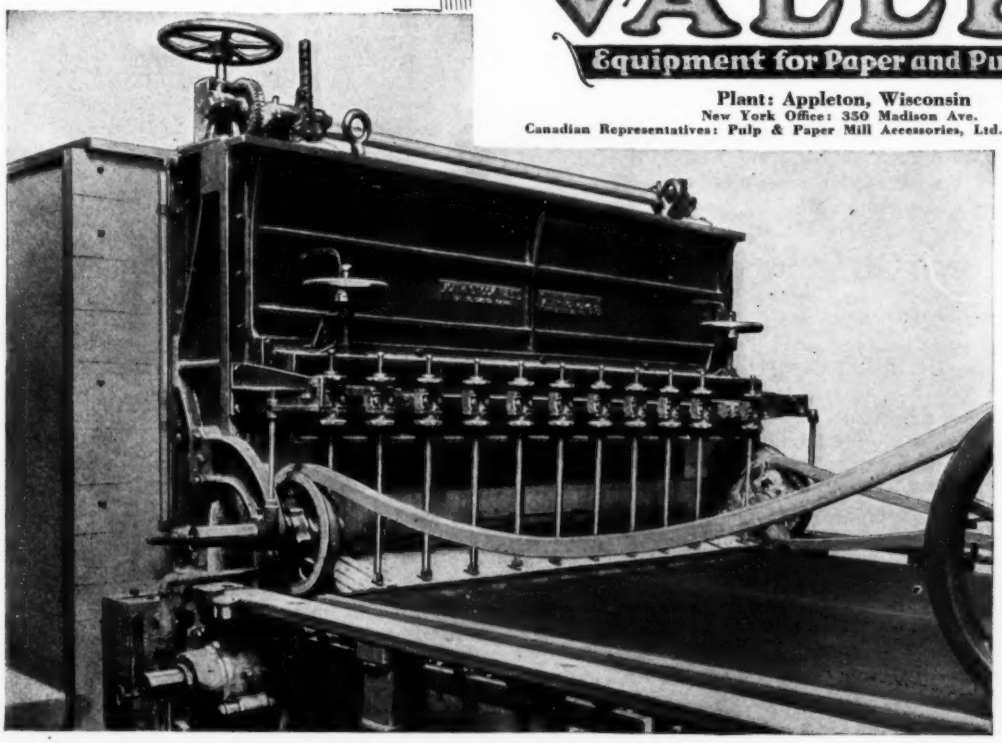

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North Boston group has a total of 7 power plants, with gross rating of 93,800 horsepower. In connection with the acquisition, plans are under way for extensions and improvements, including transmission line construction. Frank D. Comerford, head of the New England Power Association, will be president of the Massachusetts company.

New Companies

New York, N. Y.—The Solid Container Corporation has been incorporated with a capital of $20,000, to manufacture paper boxes and containers. The company is represented by Barnett & Greenbaum, 50 Court street, Brooklyn, N. Y., attorneys.

Detroit, Mich.—The Denny Tag Company, West Chester, Pa., has filed notice to operate in Michigan with a capital of $500,000. Joseph P. Giroux, Lexington Building, Detroit, will be local representative.

New York, N. Y.—The Faultless Carton & Novelty Company has been incorporated with a capital of $10,000, to manufacture paper boxes, cartons and other paper goods. The incorporators are Moses Rosenblum, 254 East 174th street, and Charles Abelson, 1407 Sheridan avenue, Bronx.

Boston Paper Market Active

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., June 29, 1931—Boston paper dealers as a whole note an improved demand and much more cheerful feeling, although the trade generally had been optimistic to at least a moderate degree. At one large house it is stated that in fine paper, mill order business is coming in well, but that warehouse business is spasmodic. Fine writings seem to show greater improvement.

Encouraging reports are heard in the wrapping paper market. The amount of tonnage is well sustained, with a larger demand here and there. The tendency to offer special discounts, which has been rather prevalent, has been remedied to a great degree. With one wrapping paper house May was the best month for over a year.

Several distributors in the kraft division particularly have noted a betterment in business. There is now more of a tendency to maintain prices at present levels. A more lively demand for box board has developed, with prices unchanged. In specialties there is a little more buying. Due to developments last week, there has been some trend towards higher prices for paper stock, but no sales are reported yet at higher levels than those prevailing, either in old papers or rags.

F. B. Chapman Addresses Lumbermen

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., June 29, 1931—F. B. Chapman, treasurer of Finch, Pruyn & Co., delivered the principal address at the annual meeting of the Adirondack Lumbermen's Association in this city. More than fifty delegates from Warren, Washington, Saratoga, Essex, Clinton and Franklin counties were in attendance at the meeting at which new officers for the year were chosen. Robert T. DeLong was elected president to succeed Guy H. Ralph and he will also serve as chairman of the board of directors. Among the directors chosen were the following: Horace J. Willard, Glens Falls; L. V. Streever, Ballston Spa; L. C. Dunning, Greenwich; L. R. Mead, Ticonderoga; Vernon Lamb, Lake Placid; W. C. Sheldon, Fort Ann; J. A. Murphy, Wevertown; H. A. Higby, Willsboro; E. R. Carroll, Keeseville, and T. F. Luther, Mechanicville.

To Handle 30,000 Cords of Pulpwood

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., June 29, 1931—The International Paper Company has awarded a contract for the handling of over 30,000 cords of imported pulpwood to the Fort Orange Stevedoring Company, of this city following competitive bidding. The contract is among the largest placed here this season and means incidentally that the local concern will have charge of unloading operations at the port terminal here prior to shipment to the mills in Northern New York. The bid placed with the paper concern by the local company quoted a much lower figure per cord than any of its competitors and in obtaining the pulpwood contract it has crowded the Jarka Corporation, of this city, out of one of the most important to be placed here in some time. Previously the Jarka Corporation has been successful in obtaining contracts of a similar kind, it being a large firm with branches in many ports.

Among those identified with the Fort Orange Company is David Roach, head of the Williams Line Lighterage Company, which last year handled the Russian pulpwood shipments landed at the local port terminal by the International Paper Company. These shipments, however, were unloaded at New York harbor prior to being shipped the remainder of the distance to this city by a chain of barges. The initial cargo of Soviet pulpwood is expected to reach here this week and is expected to compromise about 2,800 cords. The S.S. Minnequa is the vessel scheduled to arrive here from Leningrad and it will not stop at New York inasmuch as the Deeper Hudson River now permits the passage direct to this city of seagoing ships without any difficulty.

Confer with St. Regis Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., June 29, 1931—Executives of the St. Regis Paper Company held a conference at the Black River Valley Club this week with representatives of the local Papermakers' Union relative to determining a satisfactory wage scale for the future. Although the meeting was a lengthy one and included morning and afternoon sessions it was learned that nothing definite was accomplished. Among those attending were H. E. Machold, Charles MacMillan and Carl B. Martin, of New York, vice presidents and treasurer respectively of the St. Regis Company, Corwin T. Jewell, general manager, and E. L. McCormack, of Deferiet, general superintendent.

During the visit to this section it was said that Mr. Machold and his associates would make an inspection tour of the St. Regis interests at Oswego which includes the Bates Valve Bag plant and the Taggart Paper Mills. There have been rumors of contemplated changes in the administration force of the company and a series of conferences have been staged in this city, New York and elsewhere attended by the leading executives.

Kalbfleisch New Chemical Supplement

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HOOVER PLAN INSPIRES CONFIDENCE

The immediate and enthusiastic response of financial markets to the announcement that the United States Government would favor a one-year moratorium on all intergovernmental debts, including the reparations obligations, suggests that this step, if the negotiations for its execution are successful, should be a powerful influence, working toward world-wide trade recovery, states the Guaranty Trust Company of New York in its monthly review of business and finance.

"The comment of business leaders and public officials in this country has been almost unanimously favorable. Typical of the general attitude of approval was the statement of a prominent industrial executive, who said he regarded the proposal as 'the first great constructive move we have made for the world's economic recovery.'

"The most important immediate effect of the proposal is psychological. It has served to revive hopes for economic recovery and political stability where widespread doubt and pessimism were acting as deterrent influences without much regard to actual facts or real values. The economic effects of a restoration of confidence will be great, even if the processes of readjustment move slowly and actual business improvement does not come rapidly or in appreciable volume.

"It would be a mistake to over-emphasize this proposed debt adjustment as an economic factor in itself, but as a stimulant to constructive effort and thought, both here and abroad, it carries great weight and may well mark the change in business attitude which precedes and helps to vivify business recovery.

"The publication of the Government's plan was followed by sharp advances in values in all the great financial markets of the world. Prices on the New York Stock Exchange rallied strongly in the heaviest trading in several months, and similar movements were reported from the financial centers of Europe. The condition on the Berlin Bourse was described as a buyers' stampede. Optimism in this country was reflected also in commodity markets. The day's advance in prices of four major farm products was estimated to have added $300,000,000 to the aggregate value of those crops. Export sales of copper at New York reached the highest daily total reported so far this year.

"Preliminary estimates by United States Treasury officials placed the total amount of German payments affected at approximately $406,000,000, of which $246,000,000 be sacrificed by the United States, $87,000,000 by France, $20,000,000 by Great Britain, $9,000,000 by Italy, and $44,000,000 by other companies. These payments, of course, would not be cancelled, but merely suspended for a year, so that the amounts actually sacrificed would be equivalent to one year's interest on all future sums payable under the various debt agreements.

"American business has passed through the first half of 1931 at a practically unchanged level of activity. Such variations as have occurred have been mainly seasonal in character and have failed to show any convincing signs of a fundamental change in trend. The expansion of industrial operations during the first quarter brought some encouragement, but its possible favorable implications were surrounded with a good deal of doubt, due to the fact that the revival was accompanied by no indication of price stabilization. Subsequent events have proved that doubt to have been justified.

"Although no definite improvement has yet become visible, there is some basis for the growing belief that the lowest level of depression has been seen or will be seen within the very near future, and that some degree of tangible recovery should manifest itself during the second half of the year. The very fact that six months have passed without bringing further significant recession can reasonably be regarded as a sign that the process of readjustment is nearing completion. Moreover, the general level of activity appears to have reached approximately as low a point, in comparison with what is generally regarded as normal, as it ever did in the course of past depressions. The recent behavior of security and commodity markets has also been considerably more reassuring than it was during the earlier part of the year. Many corporation statements for the first half year are certain to be unsatisfactory and will have some depressing effects, which will, however, be lessened if the returning faith in future developments grows stronger, as seems likely. The importance of looking forward, rather than backward, is now being realized.

EARN DIVIDEND ACCRUALS

The boards of directors of the International Paper Company and of the International Power and Paper Company adjourning to a later meeting the consideration of the payment of the quarterly dividends on the preferred stocks of the two companies. Announced that before allowing

for the price cut in news print recently announced and made retroactive to January 1 by a number of manufacturers, the company's earnings for the first five months of this year were sufficient to cover the full dividend accruals on the preferred stock.

After allowing for the effect of the price cut, earnings for the first quarter were slightly in excess of $500,000, and for the second quarter are roughly estimated at $1,000,000.

These figures viewed in the light of current business conditions do not compare very unfavorably with those of last year. In fact the news print properties of the company during the first five months of this year, in spite of the price cut, showed larger earnings than in the first five months of 1930, due to the very substantial reductions in production costs and overhead expenses. Further substantial savings in costs are assured as a result of which it is expected that in the absence of further adverse developments the earnings during and after the last quarter of this year will again be sufficient to cover the preferred dividends.

In the meantime, however, the retention of the company's earnings in its treasury would permit a further reduction of the company's bank debt, supplementing the program under which substantial reductions have already been made, as a result of which it is hoped that with the exception of the inventory loan of the Newfoundland subsidiary, the Company will end the year 1931 with little or no floating debt.

The meetings of directors were adjourned to permit further consideration of the matter at a later date. The dividends on the preferred stocks of both companies are cumulative.

Reforestation Activities

[FROM OUR REGULAR CORRESPONDENT]

CANTON, N. Y., June 22, 1931.—Reforestation activities are being carried on more extensively this year in St. Lawrence county than ever before and about 2,000,000 trees will be planted this season, according to F. M. Callward, head of the forestry department at St. Lawrence University. Practically all orders were placed with the Conservation Department and most of the trees were shipped from the Lowville nursery. About $10,000 in state and county appropriations under terms of the Hewitt laws is being expended in the work and already over 900,000 trees have been planted this spring.

Power corporations, organizations and private landowners are also doing considerable tree planting on their own account and it was announced that the number of orders placed with the department of forestry here this season was about twice the amount of last year. Among the concerns actively identified with the program are the Loomis Talc Corporation, Northern New York Utilities and the St. Lawrence Utilities. The latter corporation has mapped out a project calling for the planting of more than half a million young trees. Prof. Callward and his assistant, Ralph G. Unger, were among those who attended the recent reforestation convention held at the Pack Demonstration Forest near Warrensburg held under the auspices of the New York State College of Forestry at which the benefits to be derived from the Hewitt laws were fully explained.

Fine Paper Credit Meeting Held in Boston

BOSTON, Mass., June 29, 1931—Approximately thirty members of the fine paper trade from various parts of the country were present at the Fine Paper Credit Group Session Friday during the 36th Annual Convention of the National Association of Credit Men and Credit Congress of industry at the Hotel Statler last week. T. K. Cree, of Allen & Cory Company, Pittsburgh, Pa., who was chairman, is also chairman on credits in the National Paper Trade Association, making his leadership in the meeting specially valuable.

The National Paper Trade Association is trying to bring about the adoption of a uniform credit system along the general lines of that practiced in Chicago, Detroit, Minneapolis, Cleveland, Pittsburgh and Milwaukee. The trade in these cities has a system of exchange information in overlapping territories. The addresses were very convincing.

It was brought out particularly that in less than two years in the Chicago market, through the operation of this credit system, the overdue accounts were reduced from a sum of over $1,250,000 to about $200,000. It is stated that it is quite evident that the tendency is towards the universal adoption of this plan. There are several sections of the country in which the trade is approaching the system in modified form and will eventually line up with the others.

A. W. Blackman, of D. F. Munroe Company, president of the National Paper Trade Association, gave the address of welcome. Mr. Cree discussed the "Progress and Procedure of Fine Paper Credit Groups." Charles Esty, of Carter Rice & Co. Corp., gave a short history of Credit Group Development in New England; and J. E. Vaughn, Jr., secretary of the Cleveland Association of Credit Men, an address on State-Wide Credit Control.

Under the leadership of H. S. Holbrook, secretary of the Minneapolis Association of Credit Men, the following questions were discussed: (1) Is it fair to discounting customer to indulge "slow-pays" and "don't pays?" (2) What is the effect of loose credit methods upon debtors? (3) "Does unrestrained credit bring about failures in the trade?

George E. Kiefer, of Cleveland, discussed financial statements: (1) When to obtain them. (2) How to obtain them. (3) Should they be secured from old, but slow-pay customers? (4) Should action on statements be taken by member or group?

Japanese Competition in Paper

Oscar Jorgenson, secretary of the British Columbia Pulp and Paper Company, who has just returned from the Orient, says that Japanese competition is being keenly felt in the paper industry in China, but that since a large part of the paper shipped into China from Japan is manufactured from Canadian pulp, the effect is not as advantageous in British Columbia.

Shipping through the Japanese-controlled ports of Manchuria, Japanese paper is being dumped on the Chinese market at a price at least 5 per cent lower than the standard Chinese price. Chinese mills are suffering in consequence and a strong movement has developed in China with a view to preventing a continuance of this practice.

Mr. Jorgenson found that Japan is supplying the home demand for paper and its purchases of paper from outside are confined almost entirely to the finer grades. Saghalien is the source of most of the pulpwood used in Japan and several large news print mills have recently been established on that island.

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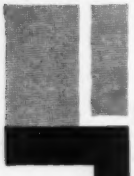

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Hydrogen Ion Methods in the Paper Industry

By William R. Willets[1]

Hydrogen ion control is not a panacea for all the troubles encountered in pulp and paper manufacture and naturally the importance of its application will vary considerably with different processes. While not claiming to be an exhaustive review this paper will endeavor to point out some of the applications made in the past, and to suggest others.

General

No attempt will be made in this paper to discuss the theory of hydrogen ion concentration nor the methods for its measurement. These points have been most adequately precented not only in the standard works of Clark (20)[2], Michaelis (51), Britton (18) and Grant (33), but by many other writers in the technical literature. Among the references having a direct bearing on pulp and paper manufacture might be mentioned the articles by Taylor (86, 87, 88, 89) one of the foremost exponents of colorimetric methods, Dernby (23) who applied colorimetry to turbid solutions by means of dialysis, Öman (56,60) who reported on a large number of indicators suitable for use in the industry and their application to weakly buffered solutions, St. Klein (83) and Lorentz (50) who dealt independently with the hydrogen ion theory particularly as applied to mill waters, Parker (63, 64) who described several types of electrometric indicating and recording instruments, Geer (32) whose work embraced not only hydrogen ion measurements but conductivity measurements as well, Francke and Williamson (30) who reported on the adaptability of various types of electrodes for control in pulp and paper processes, Roberts and Fenwick (67) whose work on the antimony electrode is of particular interest because of its increasing use in the industry, Lassieur (49) who recently described a new type of electrometric measurement using a ballistic galvanometer, Schultz (77) who applied electrometric and colorimetric methods to the finished paper, Clark and Wooten (21) who developed a null point potentiometric method for determining the amount of acid or alkali in paper and Wehmhoff (91, 92) who has published critical discussions of the various hydrogen ion methods applied to paper. Among others whose work may be cited are Hansen (37), Haug (38), Hoffman (41), Joachim (46), Karlberg (47) and Shaw (81). The theory and measurement of hydrogen ion concentration is also taken up in many of the papers which will be referred to later.

The Sulphite Process

The sulphite process may be roughly defined as the treatment of wood in the form of chips with solutions of sulphurous acid and one or more alkali bisulphites at elevated temperatures and pressures to yield pulp of high cellulose content suitable for paper making.

While the hydrogen ion theory has been applied to the theory and control of this process much still remains to be done. Escorrou and Carpentier (28) have made what is probably the most intensive study along this line. They followed the change in pH throughout the entire process, starting with the raw acid and continuing until the pulp had been washed. Their observations regarding the pulping process are of particular interest as they showed clearly that bleachability and other pulp qualities can be closely gauged by following the course of the pH-time curve. They found in their experiments that when the pH first increased erratically, followed by a final decrease and increase, the resulting pulp was very "hard" and difficult to bleach. This was explained by the fact that the digester charge was reimpregnated after the lignin and carbohydrates had been dissolved. The first impregnation was probably never thorough nor complete. In a second cook, in which the pH rose very gradually during the first impregnation period, and decreased during the incrustant-dissolving period the pulp was found to be of good "soft" quality and easy bleaching. In this latter cook the pH rose from 1.7 to 1.9 very gradually for 15 hours, at which point it was held for 3 hours. During the incrustant-dissolving period it rose slightly more abruptly to 2.3-2.4, finally dropping to 1.8 at the end of 27 hours, at which time the digester was discharged. It should be noted that in both cases the cooks were of long duration. Perhaps this is the reason that Richter (66), using the short cook in vogue on this continent, failed to confirm all their conclusions, although he did state that pulp blown at a pH of 1.8 bleached more rapidly than that blown at a pH of 2 or over. Fotijew (29), more recently, has published results tending to confirm the work of Escorrou and Carpentier.

Stemschneider and Stolz (82) stated that the increase in hydrogen ion concentration towards the end of a cook is the result of the liberation of ionized organic acids. Frohberg (31) noted that brown and brittle cooks might be caused by the conversion of cellulose to degradation products by excessive hydrogen ion concentration, and therefore recommended close control of this factor. Birchard (12, 13) and Berquist (9, 10) also pointed out that unless cooking is closely controlled the rather highly ionized lignosulfonic acids formed may cause a brittle, burnt pulp. The latter divided the cooking operation into three periods: the first of penetration, the second of alkalinity, caused by the complete hydrolysis of the sulphite to sulphur dioxide and base, and the third the consumption of the free base with corresponding increase in hydrogen ion concentration. Ber-

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* Presented before the Society of Chemical Industry, American Section, Chemists' Club, New York City, May 9, 1930. Revised June 1, 1931.

[1] Junior member TAPPI, Western Electric Company, Kearny, N. J.

[2] Numbers refer to the bibliography at the end of the paper.

quist stated that cooks were more often "burnt" during this final period than at any other time.

Hägglund (34, 35) concluded that the rate of solution of lignosulphonic acid depends largely on the pH, dividing the cooking period into two stages, the first a sulphonation of the lignin, and the second the solution of the sulphonated lignin. He emphasized the fact that it was necessary to have sufficient free base present to neutralize the ionized acids to prevent "burnt" pulp. Both he and Öman (57) discussed the possibilities of adding waste sulphite liquor to the digester to act as a buffer for free sulphur dioxide. Rys (74) reported on a number of sulphite cooks, arriving at practically the same conclusions.

Particular mention should be made of the work of Miller, Swansson and Söderquist at the United States Forest Products Laboratory, Madison, Wisconsin (52) on the influence of hydrogen ion concentration on sulphite pulping. They found that the process was an acid hydrolysis, the lignin being removed by ionized sulphurous acid. Cooking was hindered by a preliminiary acid hydrolysis of the wood.

Taylor (87) and others have pointed out that corrosion troubles in the sulphite industry may be largely eliminated by close control of the hydrogen ion concentration of the cooking liquor.

Alkaline Pulping

In general the liquors used in the soda and sulphate processes are so concentrated and alkaline as to be outside the limits of hydrogen ion methods. Although little or nothing has been done on the problem it is possible that these methods might be applied to the recovery processes in which the alkali is reclaimed.

Rag Pulp

Britton (17, 18) has pointed out the possibility of pH control in cooking rags. Rags are boiled with alkali to remove gums, nitrogenous matter, etc. This treatment tends to soften the surfaces of the fibers and to cause the precipitated calcium carbonate and ferric hydroxide to become fixed in them. Treatment with acid wash waters removes these precipitates and hardens the fiber surfaces, but unless this acid washing is closely controlled a greatly weakened material may result. The best and easiest method for such control is undoubtedly the measurement of pH.

Pulp Washing—Waste Liquors

Escorrou and Carpentier (28), Taylor (89) and others (58, 70, 71) have noted that the carrying over of cooking and bleach liquor residues generally causes foaming troubles during the paper making process, and that the course of washing may be closely followed by hydrogen ion methods.

Öman (58) showed that the properties of paper made from sulphite pulp are somewhat dependent on the pH of the water used for washing, and advised in certain cases the addition of milk of lime to the wash water to secure desired finish and sizing qualities.

Öman (61) also discussed the effect of adding sulphite waste liquor to river water, a very important subject from the viewpoint of stream pollution. A dilution of 1:300 changed the pH from 6.6 to 4.5; a dilution of 1:3000 (less than would ever be experienced in practice) from 6.6 to 6.4, a negligible amount. On standing the pH of the diluted liquor decreased because of the oxidation of the sulphite to sulphate ions.

Most schemes for the utilization of sulphite waste liquor for the manufacture of alcohol call for the lowering of hydrogen ion concentration by the addition of lime (39). Sulphite waste liquor, even when desulphurized has a pH in the neighborhood of 3.5 or even lower while yeast only causes fermentation at a pH of 4-5 or higher.

Bleaching

The bleaching of pulp may be defined as the whitening effect obtained when the impurities remaining after the cooking process are removed by the action of an oxidizing agent, usually calcium hypochlorite. Although this subject has been studied quite intensively, relatively little emphasis has been placed on the effect of hydrogen ion concentration.

It has long been known that the bleaching process can be greatly accelerated by the use of an "acid" bleach. However, Berquist (8, 11) has reported that the best color and strength is obtained with an alkaline bleach and that acids should be added only under the closest control. Taylor (87, 89) and Britton (17, 18) agree as to the necessity of extremely close control in acid bleaching; the latter mentioned the use of alum to obtain a pH of about 4, adding however that there is a tendency under these conditions to precipitate aluminum hydroxide in the fibers. He suggested the use of a weak acid (such as acetic with a dissociation constant of 10^{-5} Rys (75, 76) concluded that the use of various chemicals, such as sodium cabonate and bicarbonate affect the bleaching action only as they cause changes in the hydrogen ion concentration.

Hochberger (40) studied the course of pH throughout the bleaching process and found in his experiments that the pH-time curve was a straight line. The hydrogen ion concentration-time curve was logarithmic, rising rapidly after the middle of the process.

Ross, Mitchell and Yorston (73) used hydrogen ion determination in their experimental investigations on the bleaching of soda pulp. They concluded that, if as generally believed, the first reaction in the usual bleaching (with calcium or sodium hypochlorite) was an addition of hypochlorous acid to the lignin and color constituents the alkalinity of the liquor should increase. The fact that this did not occur was explained on the basis of (a) a balance between two phenomenoma, the adsorption of the alkali by the cellulose and the addition of hypochlorous acid to the encrustant material (b) oxidization rather than chlorination of encrustants and (c) production of acidic compounds during the bleaching. The optimum conditions for bleaching at a 2 per cent consistency were found to be a preliminary chlorination followed by a second bleaching at pH 10. So little bleach was required in the second stage that the desired pH could be maintained by the use of the usual M/20 phosphate and borate buffers, since the concentration of bleach was small compared to that of the buffer.

Beating and Hydration

Beating is a general term for the mechanical treatment of pulp in water to prepare it for paper making. During the process the fibers become cut, mixed and hydrated, i.e., swollen, the extent of the hydration and other action being determined by the desired quality of the finished sheet. The action is generally carried out in a Hollander beater, a description of which may be found in any standard work on paper manufacture.

Very little has been learned about the effect of pH on the beating of pulp. Morgan and Libby (53) conducted research along this line, using laboratory equipment. In their experiments, they found that the hydrogen ion concentration had a definite effect upon the hydration of the cellulose, cotton cellulose having minima hydration points at pH 4-4.5 and around pH 10, and a maximum hydration at pH 8.5 Sulphite cellulose behaved differently having a minimum hydration at pH 8.5, at which point the hydration of cotton cellulose was at a maximum. In general however, the hydration of both types was found to decrease with increasing acid concentration above the neutral point.

Hansen's work (37) tended to confirm this generality he found that beating was generally faster at higher pH values. Another investigator (2) stated that the addition of mineral acids and alkalis tended to increase the speed of beating, but that their use caused weakening and deterioration in the finished sheet.

Hall and Woodson (36) studied the effect of treating pulp in a ball mill and in a pebble mill. In the first case the pH rose from 7.6 to 7.8 and in the second from 7.6 to 8. As sulphate

pulp was under consideration in their experiments, they concluded that this was caused by the more thorough squeezing of the pulp in the pebble mill, bringing the alkali to the surface and causing a greater rise in pH.

Sizing

Much of the quality of a paper depends upon the manner in which sizing has been effected. By far the most common material used for this purpose is rosin size, generally made by boiling the resinous residue remaining after the turpentine distillation with soda ash or caustic soda, which treatment forms a sizing material consisting largely of sodium resinate with some free abietic acid. This material is emulsified in water and added to the beater, where it is precipitated by the action of alum, added before or after the size. Much controversy has centered around the reactions of the size with the alum but this discussion will not be entered into. It is in rosin sizing that hydrogen ion methods have found more general application than in other phases of paper manufacture.

Practically all writers agree that the pH of the beater contents largely determines the effectiveness of the sizing operation. Shaw (81) studied this variable and found that optimum results are obtained at a pH 5-5.5, depending on the amount of alum used, this condition was also found to be the optimum for the precipitation of aluminum hydroxide. Roschier (68, 69) stated that sizing does not take effect below pH 3.9. Britton (15, 17, 18) noted that aluminum hydroxide is not precipitated under these conditions, i. e. below pH 3.9, and that the rosin in the size begins to flocculate at about pH 3.7 (17, 18). Olson and Gortner (54, 55) concluded that the optimum pH varies from 4.5 to 6.5 for commercial pulp and from 4 to 4.5 for purified pulp, depending on other variables such as kind, quality and degree of washing of the pulp, kind and amount of filler, and the volume and hardness of the water used. Hansen (37) concurred in these conclusions, as did Taylor (86, 87, 88). Richter (66) stated that sizing is most effective at pH values ranging from 4.5 to 5.5. Edge (25, 26) obtained maximum sizing at pH 5 when alum was added after the size, but when the pH was first adjusted by means of sulphuric acid or caustic soda, as needed, the optimum pH was 4.

Many attempts have been made to substitute mineral acids and acid salts for alum as rosin precipitants (22, 24, 25, 59, 72, 81). These have proven unsuccessful probably because the sizing phenomenon depends not only on the hydrogen ion concentration but also on the hydrolysis of alum to the colloidal hydroxide, which is adsorbed on the fibers and fixes the rosin size.

Hydrogen ion control is finding use in actual beater room control. In some cases it acts as a check on the possible erroneous omission of size and alum from the furnish (94). In other cases, it is used throughout the beating process as a definite control on the amount of size and alum used, effecting considerable economies (7). The following pH values were generally found to hold: pH 6.5-7.5 with an average of pH 7 for the stock and pH 4.5-6.0 with an average of pH 5 for the white water in the trays at the paper machines. If the stock was acid before the addition of the size local coagulation of rosin occurred causing irregular sizing and even size spots. If the stock was distinctly alkaline, pH 7.5 or over, it was tested for the calcium and magnesium which are detrimental to sizing.

Hydrogen ion concentration size plays a part in the drying of the sized paper sheet. Öman (62) concluded that paper sized at pH 5 gave the best results when dried at 85°C., at pH 8, the worst.

A process for making board (79, 93) utilizes hydrogen ion methods extensively. The vat next to the liner vat is maintained slightly acid by the addition of alum so that the alkaline plies of the filler are prevented from exercising a desizing action on the liner.

Sodium silicate is finding increased usage as a beater size, its possibilities are shown in the works of Blasweiler (14), Vail (90) and others. It is added to the beater and precipitated with alum in much the same manner as rosin size. Britton (16, 17, 18) as a result of his researches on the precipitation of basic aluminum sulphate and silicate concluded that the hydrogen ion concentration for optimum silicate sizing is analagous to that for rosin sizing, about pH 4-6.

Dyeing

It is a well known fact that pH has a marked effect on dyeing in all its branches. The taking up of dyes is probably an adsorption phenomenon and therefore greatly affected by hydrogen ion concentration.

Shaffer (80) has shown that the dyeing of boards is largely dependent on the pH of the stock and of the dye being used. In coloring with calendar stains the pH of the sheet and the stain should be the same. It is very essential to control and specify the hydrogen ion concentration in matching colors, a match at one pH might not be a match at another pH. St. Klein (84) has also reported on the relation between hydrogen ion concentration and the dyeing of paper, supporting Shaffer's conclusions.

Loading

The term loading signifies the addition of clay, talc or other mineral filler to the beater for the purpose of increasing the opacity, finish and printing surface of the finished sheet. Atsuki and Mitsuo (5) and Atsuki and Hakamuta (4) have conducted detailed studies on the role of pH in this process. They concluded that retention generally increased with increasing pH. Roschier (68) and others (1) confirmed this general conclusion. He found retention increased from pH 4 to 5.6 and then remained practically constant to pH 7. He stated that fillers are retained partly mechanically and partly by the precipitation of aluminum hydroxide and rosin.

The Paper Machine

Several difficulties encountered on the paper machine may be traced in part to hydrogen ion concentration. The corrosion of machine wires, dandy rolls and other parts of the machine may be caused by an excessive amount of free hydrogen ions.

Foaming has also been studied from the viewpoint of hydrogen ion concentration. Roschier (70, 71) listed some of the sources of foam as sizing agents and cooking and bleach liquor residues, all of which are subject to pH control. In his experiments, too low pH values were found to increase foam. The addition of a colloidal substance, such as glue in small amounts, tended to reduce foam, which was at a minimum at pH 4.5-5.5 under these conditions. An excess of glue, however, tended to cause increased foaming. One of the reasons for sizing at pH 4.5-5.5 are given by Richter (66) is the absence of foam under these conditions.

Enckell (27) overcame pitch troubles on the machine by the judicious use of lime and alum in the decker chest. Campbell (19) repeated his investigations and found that it was necessary to have sufficient lime present to form a floc with the alum. When lime was added to give a pH 8.5 and alum then added to bring the pH back to 5.6 pitch troubles were encountered, but when the amount of alum was increased to give pH 4.3 no further difficulties resulted because of pitch adhering to the rolls and clogging the wire. Karlberg (47) found in investigating serious pitch trouble from an unknown source that the pH varied from 6.6 to 3.6. By using continuous control, maintaining the pH at 4.4-5, no further pitch trouble was experienced. However, when sulphuric acid was used instead of alum to maintain this desired pH range, pitch again formed on the machine. Pitch and scale troubles are prevalent as shown by inquiries in the technical literature (85) and undoubtedly hydrogen ion methods could minimize them.

Taylor (88) has pointed out possibilities of applying pH methods to the manufacture of satin white and other synthetic pig-

ments, and to the regulation of the manufacture and application of the coating mix. Bell (6) noted that the minimum solubility of casein occurred at pH 4.6, at which point, theoretically, the maximum precipitation of casein occurs. The free acid in casein had a much smaller effect than the pH on the amount of alkali necessary to change casein solutions to pH 9.16. For this reason he advised the use of casein of pH 4.6 so as to cut down the alkali required for a mix to the minimum. Regnier and Dreshfield (65) noted that the viscosity of a casein coating mix is a function of the pH, and that foaming and pinholes are also related to this factor. They stated that, "the study of the relation between the physical characteristics of the color and the hydrogen ion concentration is a very fertile field for research in the coating industry."

Finished Paper—Deterioration

The pH of the finished sheet is of great importance, since excessive hydrogen ion concentration may cause undue wear and corrosion of printing plates (17, 18) as well as affect the permanence and durability of the paper. Hoffman (42, 43, 44, 45) has conducted detailed studies on the deterioration of paper as affected by acidity. He concluded that durability and premanence decreased with increasing hydrogen ion concentration, a pH of about 4.7 being the critical point below which deterioration increased rapidly.

Methods for determining the pH of finished paper have incurred much controversy. A critical discussion of these is given by Schultz (77) and by Wehmhoff (91, 92).

The importance of the hydrogen ion concentration, particularly as it affects the deterioration of finished paper, is a prevalent subject for discussion. Methods for its determination have been studied rather thoroughly by TAPPI committees, and the general consensus of opinion is that the method of extraction is of the utmost importance. Wehmhoff has noted that if the lapse of time between extraction and pH determination is more than an hour or two the variations may be great. As this is especially true for glue sized papers he concludes that the variations are caused by collodial effects. However, if the extractions were made by identical methods the hydrogen ion determinations as made by the quinhydrone electrode, the hydrogen electrode and Fawcett-Acree isohydric indicators checked closely.

Discussion

This paper has attempted to point out the places in the general process of pulp and paper making where hydrogen ion methods are applicable. One might conclude that there are virtually no phases of the process where these methods cannot be used. This is quite true.

Hydrogen ion methods are applicable not only in the theoretical study of such processes as sulphite cooking, bleaching, washing, beating, dyeing, sizing, loading, coating, etc., but in their control as well. Control naturally follows research. This has been true of hydrogen ion control, especially in the sizing processes, and in some few cases in the cooking and washing of pulp as well.

Hydrogen ion methods, if intelligently applied, are certain to become an increasingly important factor in the improvement of pulp and paper making processes.

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To Hold Third Conference in Canada

The Paper and Pulp Section of the Printing Industries Division of the American Society of Mechanical Engineers is planning to hold a third conference in Canada in the Autumn of this year. The section has previously held small conferences in St. Paul and Detroit, and now desires to make this Canadian conference a large cooperative effort.

Assurance has been given of the cooperation of all Canadian interests. The paper and pulp associations in the United States have been invited actively to sponsor part of the program.

The fall meeting of the Technical Association will be held in Kalamazoo, Michigan on September 23, 24, and 25. Ralph Hayward, manager of the Kalamazoo Vegetable Parchment Company will be general chairman.

Improving Efficiency at Corner Brook

The 1930 annual report of the International Power and Paper Company of Newfoundland, Limited, recently made public, describes the improvement in operating efficiency at the Company's Corner Brook news print mill and the expansion of its Deer Lake hydro-electric plant to 156,000 horsepower. The company is a division of International Paper and Power Company.

Output of paper from Corner Brook mill's four news print machines averaged 515 tons a day in 1930 as compared to 483 tons a day in 1929. Output from these machines in the month of February of this year was further increased to an average of 546 tons a day. In addition to these increases on the four news print machines, the wrapper machine at the mill has been adapted for the manufacture of news print when not in use for the manufacture of wrappers, with a consequent increase in the 1930 daily average output of 540 tons a day, and the attainment in February of this year of an average output for the mill of 593 tons a day. The steady increases in output have been accompanied by material reductions in operating costs.

During 1930 the 58,000 horsepower extension to the company's hydro-electric plant at Deer Lake was put in operation, bringing the total installed capacity up to 156,000 horsepower. The installation of the additional 58,000 horsepower was made at the exceptionally low capital cost of $28.15 a horsepower and has resulted in a substantial increase in the company's earning power. The additional capacity has made possible the elimination of all but a small part of the fuel bill at Corner Brook, as the Deer Lake plant supplies the mill with sufficient current not only for power but also for the generation, through the use of electric boilers, of practically all the steam requirements of the mill. This advantage is, so far as known, enjoyed by no other news print mill.

During the year the company acquired a few additional tracts of timber which were desirable in rounding out areas already controlled. Timber holdings now consist of over 1,500 square miles of freehold and over 5,600 square miles held under Crown licenses, a total of over 7,100 square miles, which have an estimated stand of over 13,400,000 cords of pulpwood. The Crown timber licenses, with minor exceptions, are for a ninety-nine year term, of which only a little more than three years have elapsed. Due to climatic and other local conditions the expense of fire prevention work is at a minimum and losses from fire are negligible. Pulpwood costs at the mill are unusually low as a large portion of the timber is located in the watershed of the Humber River and wood on other holding is easily accessible either by rail or water.

Even after allowing for the deductions in connection with the recently announced news print price cut, earnings for the first four months of 1931 will be but little below the figures for the corresponding period in 1930, as the decrease in selling price is approximately offset by the continuing improvement in operating efficiency and the benefits of the additional hydro-electric generating capacity installed last year.

TAPPI Notes

R. Karlberg, technical director of Holmes Bruks A. B. Hallstavik, Sweden is visiting Pacific Coast mills.

W. M. Osborne, formerly of Grays Harbor Pulp and Paper Company is now with the Puget Sound Pulp and Timber Company, Bellingham, Wash.

The Iowa Engineering Experimental Station of Iowa State College, Ames, Iowa, has recently published Bulletin 102 entitled, "Experimental Studies on the Production of Insulating Board from Cornstalks," by O. R. Sweeney, C. E. Hartford, Jr., R. W. Richardson, and E. R. Whittemore.

M. Tsuzaki of Toyo Shōkai, Ltd., Tokyo, Japan, was a TAPPI office visitor this week.

Cellulose Fluidity in Cuprammonium Hydroxide*

By John L. Parsons[1]

During recent years increasing attention has been paid by the pulp and paper industry to the evaluation of cellulose fiber quality by means of chemical tests, such as the copper number and the alpha cellulose determination, and more lately the fluidity or, its reciprocal, the viscosity determination. The manufacturers of cellulose derivatives and regenerated cellulose products were the first to realize the importance of chemical quality in their raw material. The nature of the treatment employed in the isolation and purification of the fibers is naturally reflected in the material fabricated therefrom, whether it is paper, rayon, cellulose acetate, cellophane, nitrocellulose or other products. Pulp and paper manufacturers have been quick to appreciate the fact that chemical quality should not be overlooked in the evaluation of fiber value, and its possible relation to the properties of their principal product, paper.

As an indication of chemical quality and to some extent in process control, the fluidity or viscosity of cellulose in cuprammonium hydroxide solution has been employed for some time in the rayon and related industries. Only comparatively recently has it been applied in the pulp and paper industry. In order to study the fluidity figure more thoroughly as a quality criterion and its relation to the more common chemical and physical constants, a series of tests was carried out in the bleaching of a sulphite pulp. At the same time the progressive effect of the bleaching operation on fiber quality was observed.

Method

An unbleached sulphite pulp, of average bleachability, was selected from a number of experimental pulps. It possessed a permanganate bleach value of 9.4[2] and required approximately 4.6 per cent available chlorine for bleaching to a whiteness of 85-90 at a pulp consistence of 14 per cent, double stage operation. The pulp was bleached in a Dopp seamless jacketed kettle of about 35 gallons capacity provided with a ribbon type agitator, and cover. The interior of the kettle and the agitator were coated with white lacquer which had been found by experience to be reasonably resistant to the bleaching mixture. In this manner a smoother surface was obtained, facilitating the agitation of the mixture, and direct contact of the same with metal was eliminated. Temperature control was brought about by the introduction of steam or cold water into the jacket, as conditions required. During the first stage operation no steam was used, the temperature being 30 deg. C. throughout this period. Between stages the partially bleached pulp was thoroly washed on a diaphram screen and experimental wet machine. The temperature of the second stage was held at 38 deg. C. The initial charge of pulp in the bleacher comprised 5000 g. (moisture-free at 205 deg. C.). The ribbon type agitator, revolving at 9 r.p.m., raised the material at the sides of the kettle and carried it toward the center, thus providing adequate mixing.

The method of procedure was as follows: The kettle was filled with the proper weight of wet pulp and sufficient water added to give, after the addition of the bleach liquor, a pulp consistence of fourteen per cent. The required amount of commercial bleach liquor, prepared from hydrated lime and chlorine, was then slowly added. Temperatures were observed every fifteen minutes. In the first stage there was an initial rise in temperature owing to the heat of reaction but a level of 30 deg. C. was rapidly reached and did not vary during the 90 minute interval. During the second stage the heat was adjusted as necessary to maintain 38 deg. C. Periodic analyses of the bleach liquor were made during the operation in order to determine the rate of bleach consumption. At the conclusion of each hour a sufficient sample of pulp was withdrawn for subsequent analysis. This sample was immediately washed until free from available chlorine.

The distribution of the bleach liquor requirement in the first and second stages was 88 and 12 per cent, respectively. To the second stage, however, a surplus amount of bleach was added in order to produce over-bleaching. This amount was 13 per cent, thus making 25 per cent of the total bleach requirement in the second stage. At the end of 90 minutes the available chlorine was consumed, the pulp washed, as already mentioned, and returned to the bleacher. The time of washing was not included in the bleaching time. The bleaching (second stage) was then continued until less than one per cent of the bleach liquor was left. This consumed an additional three and one-half hours, making the total bleaching time five hours. The samples of pulp, withdrawn at different intervals of the process, represented partial and complete bleaching and also overbleaching. They were dried in the air after washing. The total amount of available chlorine added was 5.2 per cent, based on the weight of the pulp.

The physical tests on the various samples were carried out through the generous cooperation of Charles R. Tait, in charge of process control. They comprise the following: color, as measured by standard color wheels; determination of maximum bursting strength (Mullen) after beating in an Abbe' mill; and folding endurance (Schopper) of sheets made from the beaten stock. All strength and folding endurance tests were made under controlled humidity conditions, i.e., 65 per cent relative humidity at 70 deg. F.

To evaluate the chemical characteristics of the pulp samples the following determinations were made: alpha cellulose[3]; copper number, according to the Schwalbe-Hagglund method[4]; and fluidity of a 0.5 per cent cellulose solution in cuprammonium hydroxide[5]. The influence of the manufacturing process, and in particular the bleaching treatment, on the fluidity or viscosity of solutions of cellulose fibers has already received considerable study and discussion during the past two or three years[6]. In the results obtained from this investigation the relationship between the fluidity figures and the constants obtained from the other chemical and physical tests has been emphasized.

Discussion of Results

The data pertaining to the several samples of bleached pulps and the results of the analytical tests are summarized in Table I.

TABLE I

Sample	Total time of bleaching (minutes)	Per cent Residual bleach	Per cent concn. Available chlorine	Physical Constants: Color	Physical Constants: Maximum bursting strength (Mullen)	Physical Constants: Folding endurance (Schopper)	Chemical Constants: Fluidity (Recip. poises)	Chemical Constants: Copper number	Chemical Constants: Per cent Alpha cellulose
First Stage									
0	0	100	0.583	..	112	1049	7.5	2.40	89.02
1	60	2.86	0.017	—70	106	1174	11.3	2.14	88.21
2	90	0.00	0.000	70	111	1402	10.7	1.96	88.44
Second Stage	90	35.0	0.167	..	....	.....	....	....	.....
3	150	15.6	0.074	85	116	1208	13.7	2.18	88.23
4	210	7.7	0.037	90	105	976	16.3	2.03	87.43
5	270	3.1	0.015	90	105	1099	17.5	2.54	86.82
6	300	0.6	0.003	90	103	827	18.1	2.81	86.89

Bleach requirement of pulp was 4.6 per cent available chlorine, using 14 per cent consistence in both stages. 88 per cent of requirement added in first stage; 25 per cent in second stage.

Bleaching temperatures: first stage, 30 deg. C.; second stage, 38 deg. C.

Folding endurance calculated on substance 20 basis (17x22—500).

The fluidity, copper number and alpha cellulose figures are the average of two closely agreeing determinations, the last two being on a moisture-free basis. The fluidity is based on a 0.5 per cent cellulose solution.

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 17-19, 1931.
Contribution of the Fibrous Raw Materials Committee.

[1] Member TAPPI, research chemist, Hammermill Paper Company, Erie, Pa.

In Fig. 1 is shown graphically how the bleaching process affected the physical properties of the fibers. For comparison the fluidity figures are also plotted. It will be observed that maximum bursting strength, developed at the end of approximately two and one-half hours, corresponds to a satisfactory whiteness of the pulp. Maximum folding endurance was developed slightly earlier in the process, namely, at the end of the first stage operation or after one and one-half hours. The fluidity increased in the manner shown from 7.5 for the unbleached pulp to 18 for the overbleached sample. Except towards the end of the first stage the slope of the fluidity curve is nearly constant.

It should be understood that fluidity figures of unbleached pulps are not strictly comparable with those of bleached pulps owing to the presence of lignin and related impurities in the former. Such impurities greatly affect the nature of the colloidal dispersion in cuprammonium hydroxide solution and yield false values in comparison with figures obtained from testing bleached celluloses. Among themselves, however, the fluidities of unbleached pulps are often very informative.

This same precaution applies to the proper interpretation of the alpha cellulose content of cellulosic material. While the residue remaining after the mercerizing treatment of bleached cellulose fibers has been arbitrarily termed alpha cellulose and supposedly represents an alkali-resistant, purer form of cellulose, the residue left after the mercerization of unbleached pulp contains cellulose plus lignin incrustations not entirely removed by the alkali. Thus these chemical constants for unbleached pulps cannot be interpreted in terms of purified celluloses.

The effect of overbleaching or oxidation of the cellulose on the physical properties of the fibers, shown in Fig. 1, is apparent after three and one-half hours of bleaching. This is indicated by a decrease in bursting strength, folding endurance and increase in fluidity. Fluidity figures in excess of 16 apparently connote deterioration in the fiber quality, whereas the pulp sample of satisfactory color and strength qualities possessed a fluidity of approximately 14 reciprocal poises.

In Fig. 2 the effect of bleaching on the chemical properties of the fibers is shown. At the end of 2 to 3 hours exposure to bleach liquor a bleached pulp was obtained possessing uniformly a low copper number, high alpha cellulose and a fluidity of 12 to 15. The copper number then increased less than one unit from a fully bleached pulp to a distinctly overbleached one. The usefulness of the copper number as an index of chemical and physical quality is limited by the fact that the experimental error is large and also by the fact that investigators have shown that a change of one unit may mean wide differences in physical fiber characteristics, even to the complete loss of strength.

The change in the alpha cellulose content during the third to fifth hour amounted to one unit and, considering that the experimentor error in this determination may amount to ± 0.2 unit, the test may or may not show slight changes in cellulose quality. These changes are more clearly indicated, however, by an increase in several units of fluidity, which is capable of being measured by the method employed in this study to less than 0.5 unit over this fluidity range. Throughout the entire bleaching operation the fluidity increases progressively but the physical and chemical properties of the pulp were not seriously impaired until the fluidity exceeded 16 reciprocal poises. Beyond this point the continued action of the surplus bleach liquor resulted in a more rapid deterioration of the fibers as shown.

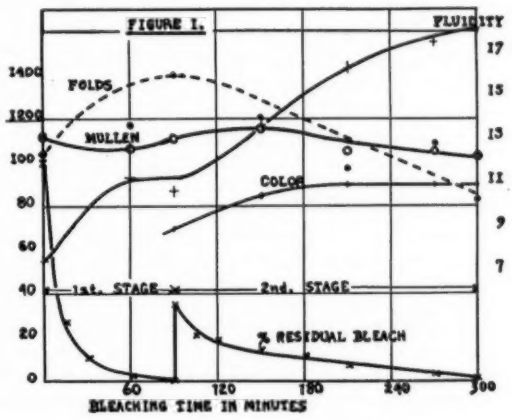

FIG. 1.
Effect of bleaching on physical properties of fibers.

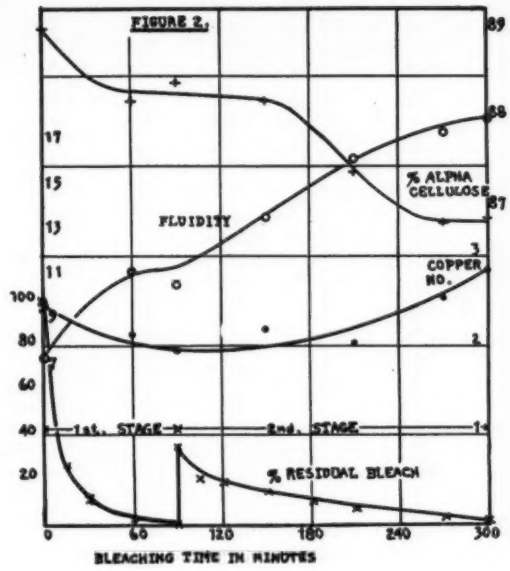

FIG. 2.
Effect of bleaching on chemical properties of fibers.

The bursting strength figures and the copper number values are plotted against fluidity in Fig. 3. Other investigators have shown that increase in fluidity (loss in viscosity) indicates a corresponding decrease in physical strength of fibrous material. This statement applies, of course, only to purified cellulose material and not to unbleached fibers. In the diagram this approximate area is shown to the right of the maximum strength value or minimum copper number. Fluidity figures above 13 reciprocal poises were accompanied by a sharp decline in strength and change in copper number. In Fig. 4 a similar comparison is made between folding endurance, alpha cellulose content and fluidity. Here there is practically a linear relationship between the double folds and the fluidity of the bleached samples and the same is generally true of the Mullen test. There appears to be no absolute correlation between the latter and the alpha cellulose content, except that continued oxidation of the cellulose yielded values through which a straight line might be drawn.

Thus the fluidity or viscosity of purified cellulose in cuprammonium hydroxide solution appears to be a favorable index of quality. It possesses the advantage over several of the other more familiar quality indices in that uniformly greater numerical differences are obtained. In interpreting fluidity data, however, a knowledge of the source of the fibrous material and its treatment is essential. Considerable evidence is now available which makes it seem plausible that the fluidity figure is a measure of certain of the structural units of cellulose itself. For instance, Stamm[7] is of the opinion that between wood cellulose and cotton cellulose there exists a difference in the degree of association of similar structural building units. His recent work on the dispersion of cellulose in cuprammonium solution has led him to the belief that a cotton cellulose solution consists essentially of a monodispersed material (constituent A), while a sulphite cellulose sol-

ution comprises particles of the same kind as in cotton plus a material of finer dispersion (constituent B). The latter is approximately one-half the weight of the former. Thus, constituent A, the heavier particle and identified with both cotton and wood celluloses, when dissolved in cuprammonium hydroxide solution is apparently related to the highest polymerized unit present in the material. The smaller particles represented by constituent B might arise from (1) the presence of less polymerized polysaccharides, such as pentosans and hexosans found in wood cellulose, or (2) the presence of degradation products formed from constituent A by chemical action, such as acid attack or oxidation. Such an explanation affords a clearer picture as to why the fluidity figure increases (loss in viscosity) as the result of a chemical modification of the cellulose fibers. Furthermore, the fluidity determination as a means of evaluating fiber quality appears to be on a far more scientific basis in the light of modern cellulose chemistry than the copper number and alpha cellulose determinations which are based largely on empiricism.

The writer wishes to acknowledge the generous assistance given not only by Mr. Tait and his associates, but also by William F. Reichert and Thomas T. Schwab in this study.

Summary

The use of the fluidity determination (reciprocal of viscosity) as a means of evaluating cellulose fiber quality has been studied in relation to the more common criteria, such as bursting strength, folding endurance, copper number and alpha cellulose content. For this purpose an unbleached sulphite pulp, requiring 4.6 percent available chlorine, was bleached in a small experimental bleacher, employing two stages of bleaching and a pulp consistence of 14 per cent. An excess of bleach liquor was added in the second stage in order to produce overbleaching. Pulp samples were taken hourly during the experiment. These pulps upon examination yielded the following facts:

1. The fluidity increased progressively except for a brief interval towards the end of the first stage of the bleaching process when it was nearly constant. It is emphasized that an intelligent intrepretation of these data is necessary to their correct understanding. For instance, the fluidity value of an unbleached pulp is falsified to the extent of the lignin and other impurities present. Such figures cannot be compared directly with those obtained from bleached fibers.

2. The bursting strength and folding endurance figures increase to a maximum, corresponding closely to the completely bleached pulp, and thereafter decline owing to overbleaching and consequent deterioration in the physical properties of the fibers.

3. Practically straight line relationships exist between the bursting strength and folding endurance figures when plotted against the fluidities of the corresponding pulps over the range beyond that of the completely bleached pulp as determined by whiteness tests.

4. At the period in the process when the desired bleached pulp was obtained, the copper number was at a minimum and the alpha cellulose content was nearly constant although the fluidity progressively increased.

5. Even after an exposure of the pulp to bleach liquor for five hours at 14 per cent consistence, the copper number was increased by only about 0.9 unit, and the alpha cellulose content reduced 1.6 units, while the bursting strength and folding endurance were decreased by 13 and 575 units, respectively. The fluidity increased, however, from about 14 for the bleached pulp to 18, a change of 4 units. The precision with which the fluidity test is determined is usually considerably higher than with the other quality tests.

6. The fluidity test appears to possess the advantage over some of the more familiar quality indices of cellulose in that uniformly greater numerical differences are obtained. This was found to be especially true in comparison with the copper number and alpha cellulose determinations. In interpreting physical and chemical constants of cellulosic material a knowledge of the source of the fibers and their treatment is essential.

7. An explanation is given of a plausible reason why fluidity measurements are indicative of certain changes in the structural building units of the cellulose complex.

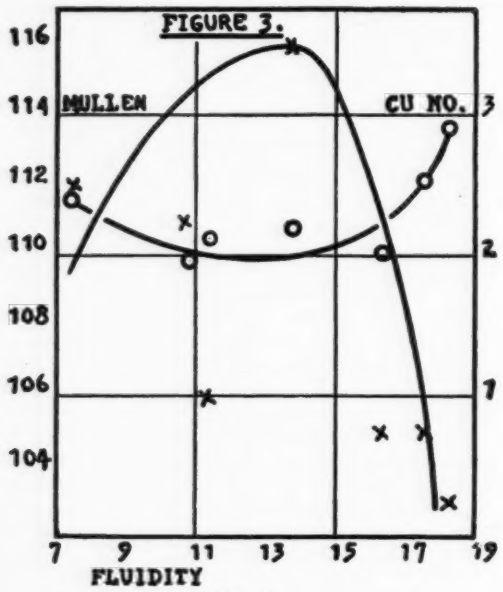

FIG. 3.
Fluidity plotted against bursting strength (Mullen), and copper number.

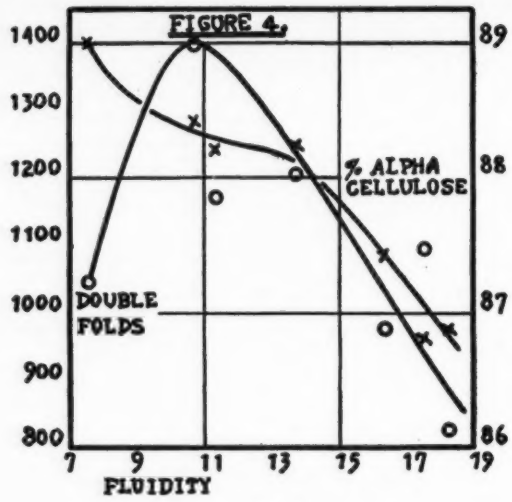

FIG. 4.
Fluidity plotted against folding endurance (double folds) and alpha cellulose content.

References:

2. Johnsen and Parsons, Zellstoff u. Papier, *2*, 258 (1922).
3. Ritter, Ind. Eng. Chem., Anal. Ed. *1*, 54, (1930) The alkali-cellulose mixture was not diluted, however, before filtering.
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Current Paper Making Literature

Abstracts of Articles and Notes of Papermaking Inventions Compiled by the Committee on Abstracts and Bibliography of the Technical Association of the Pulp and Paper Industry

Clarence J. West, Chairman

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Machinery

Doctor for Paper Machine Rolls. L. S. Johnson and F. W. Vickery. Brit. pat. 336,554.—A doctor has the edge of the blade pressed on the roll by spring pressure acting from its carrier on the face and on to the edge of the blade which can thus be set at an angle from 45 deg. to nearly radial to the roll and can move against spring action in two direction without the risk of chattering. A support intermediate between the blade and the carrier has mutually inclined faces on one of which the blade is spring-pressed, the other being for attachment to the carrier, thereby economising space, and further, the support is rendered stiff by reason of its bent cross-section.—A.P.-C.

Fourdrinier Paper Machine. Herman L. Kutter assignor to Beloit Iron Works. U. S. pat. 1,773,270, Aug. 19, 1930.—In order to make the fourdrinier table lighter, the supporting structure is built of tubular beams and is formed in hinged sections adapted to be elevated at its intermediate hinged points.—A.P.-C.

Roll Suitable for Paper-Making Apparatus. Frederick R. Woodward assignor to Stowe and Woodward Co. U. S. pat. 1,787,890, Jan. 6, 1931.—Pieces of rock forming a portion of the active surface of the roll are held in position by a binder of other material such as rubber.—A.P.-C.

Paper-Machine Suction Box. Earl E. Berry assignor to Beloit Iron Works. U. S. pat. 1,790,852, Feb. 3, 1931.—The suction box is constructed of relatively thin sheet metal consisting of a chromium-containing alloy having a high modulus of elasticity and resistant to corrosion by white water.—A.P.-C.

Fourdrinier Paper Machine. Austin E. Cofrin. U. S. pat. 1,790,536, Jan. 27, 1931.—The tube rolls are made of sufficiently large diameter to substantially reduce the effect of centrifugal force on water on the surface of the rolls, so as to practically eliminate the harmful effect of such water on the forming sheet.—A.P.-C.

Press Rolls. H. L. Muller. Papeterie 53, 2-6 (Jan. 10, 1931).—The crowning of press rolls and its drawbacks are briefly discussed. They can be avoided by using uncrowned rolls and mounting the upper roll slightly out of alinement with the bottom, so that when no pressure is applied the two rolls touch only the center; on applying pressure to the trunnions, the rolls are deflected and at the right pressure contact is established along the whole length of the rolls. The lower roll is driven and in turn drives the upper one through a friction gear permitting of a slight difference in speed of the two rolls, the speed of the disalined roll decreasing with the degree of disalinement on account of the increase in the virtual circumference. Machines constructed specially for the purpose have a scale indicating the exact degree of disalinement, so that the machine tender may adjust it according to the pressure exerted at the presses.—A.P.-C.

Removable-Fourdrinier Paper Machine. James K. Darby. Fr. pat. 690,501, Sept. 23, 1930.—The machine is constructed in such a manner that when the table is removed to effect a change of wire, the distance between the breast and couch rolls is shortened so as to facilitate placing the new wire. This may be produced by keeping the couch roll stationary and running out the table, including the breast roll, perpendicular to the length of the machine and running out the couch roll diagonally towards the breast roll.—A.P.-C.

Process for Obtaining a Perfect Bonding of the Fibers of Two Sheets of Paper. E Casanovas. Belg. pat. 372,060, Aug. 31, 1930.—One of the sheets is formed on an ordinary fourdrinier wire and the other on a cylinder machine, and the latter is applied to the former before passing over the last suction boxes of the fourdrinier machine.—A.P.-C.

Conditioner for Paper-Machine Felts. Dee L. Sheafor assignor to The Black-Clawson Co. U. S. pat. 1,791,384, Feb. 3, 1931.—The conditioner consists of a suction box and spray pipe, both on the same side of the felt and mounted so that they can travel across the width of the felt, the spray being in advance of the suction box.—A.P.-C.

Paper Making. R. Marx Brit. pat. 333,167, May 1, 1939.—The felts or the felts and web at the wet end of a paper machine are passed through one or more heated zones to accelerate removal of moisture and to prolong the life of the wet felts.—A.P.-C.

Improvement to Paper-Machine Doctors. Vickerys Ltd. Belg. pat. 370,249, June 30, 1930.—The flexible blade which is pressed into elastic contact with the paper-machine roll is at a fairly large angle to the surface of the roll, while the plane passing through the supporting axis and the line of contact of the blade with the roll is at a relatively small angle to the surface of the roll.—A.P.-C.

Drive for Calender and Reel. Siemens-Schuckertwerke A. G. Belg. pat. 372,272, Aug. 31, 1930.—The calender and reel are driven by separate motors. The starting of the reel motor is effected automatically by the calender-motor control. A roll rests on the sheet passing from the calender to the reel; variations in the tension of the sheet change the position of this roll, which in turn acts on the reel-motor regulator.—A.P.-C.

Heat-Processing Machine for Sheets and Boards. John A. Stevens assignor to The Upson Co. U. S. pat. 1,775,950, Sept. 16, 1930.—The invention provides a machine suitable particularly for the continuous production of double-faced wallboard; e.g., made from a body of sodium silicate and finely powdered dolomitic limestone with two outer paper facings. Two sheets of paper are brought together between a pair of rolls and the body material is fed between the two sheets. The rolled mass is passed between a pair of upper and lower heated platens, the distance between which regulates the thickness of the board. From the platens the sheet passes into a hardening oven where it is treated by direct contact with a heated gas, preferably hot air. The feed rolls, which control the travel of the sheet through the machine, are placed beyond the hardening oven.—A.P.-C.

Severing Mechanism for Board-Making Machines. Francis W. Harney assignor to The Upson Co. U. S. pat. 1,775,256, Sept. 23, 1930.—The sheet is cut by means of two co-acting rotary knives, geared together and driven by an electric motor through a magnetic clutch. The forward edge of the board sheet on

abutting against an electrically-actuated stop device, throws in the magnetic clutch to cut a predetermined length of sheet, the peripheral speed of the edge of each knife being the same as the linear speed of the board to be cut. The knives are automatically stopped after a single revolution.—A.P.-C.

Adjustable Making Board and Flow Deflector for Paper Making Machines. Arthur T. Yodder. U. S. pat. 1,771,600, July 29, 1930.—The invention, while applicable to fourdrinier machines, is particularly adaptable for cylinder machines to guide and equalize the flow of stock to the cylinder mold. A vertically adjustable making board is mounted at the upper part of the baffle over which the stock flows into the vat proper. A series of closely-spaced deflector plates are mounted on the making board; they are arranged in groups, each of which is independently adjustable as regards its angular position relative to the making board.—A.P.-C.

Stock Conduit. Harry Fletcher. U. S. pat. 1,774,363, Aug. 26, 1930.—The purpose of the invention is to provide a stock conduit for delivering the stock directly on to the wire of fourdrinier machines, with the elimination of screens, head boxes, agitators, etc., which is obtained by the shape of the conduit. It is constructed to deliver a definite volume of stock and to reduce the velocity gradually and smoothly. The enlargement in cross sectional area for reducing the velocity of flow is brought about by gradually increasing the width until it is substantially equal to that of the flow box at its point of communication with the latter; the depth of conduit is decreased at a considerably smaller rate than the increase in width. It is claimed that with this stock conduit the speed of the machine can be increased without detriment to the delivery of the stock to the wire.—A.P.-C.

Shaking Mechanism for Fourdrinier Paper Machines. Alfred F. Helin assignor to The Bagley & Sewall Co. U. S. pat. 1,774,553, Sept. 2, 1930.—An improved mechanism is provided for effecting the angular and widthwise movement of the sliding frames, in which the use of gears, levers and moving parts extending across the machine is eliminated. This movement is effected by the use of a pair of fluid-operated pistons arranged to work in opposite directions, with controlling valves operating automatically to reverse the movements of the pistons.—A.P.-C.

Suction-Box Head for Paper Machines. John Reagan and Arthur Bernard. U. S. pat. 1,774,844, Sept. 2, 1930.—A socket is mounted centrally on the suction-box head and is provided with a transverse pin for the purpose of connecting a bayonet-slotted handle or bar thereto. The slotted end of the bar is reinforced and the sock is provided with an outwardly diverging flange constituting a guide for directing the bar into the socket.—A.P.-C.

Cylinder Web-Forming Apparatus. Sverre Diesen. U. S. pat. 1,771,559, July 29, 1930.—It has been suggested that cylinder molds be divided into a number of cells, the upwardly moving surface of the mold forming wall in a pulp container and the cells, which are filled with air, being subjected to suction as their screening surfaces come into contact with the pulp. The drawbacks of this construction are excessive power required for the suction pump and uneven deposition of pulp on the surface of the mold. According to the present invention these drawbacks are avoided by having the cells filled, or substantially filled, with water before they enter into contact with the pulp.—A.P.-C.

Cleaning Device for the Cylinder Molds of Paper Machines. Gilbert J. Scofield. U. S. pat. 1,771,355, July 22, 1930.—A nozzle capable of projecting a thin blade of water under high pressure is mounted so that it can be displaced across the full width of the cylinder mold, delivering the jet against the outside surface of the cylinder at a point between the one where the felt picks up the freshly formed web and the one where the cylinder mold is submerged in the stock.—A.P.-C.

Winder-Motor Drive-Control System. Stephen A. Staege assignor to Westinghouse Electric & Manufacturing Co. U. S. pat. 1,768,939, July 1, 1930.—Each drum of a two-drum winder is driven separately by a compound-wound, direct-current motor having an adjustable drooping characteristic speed-torque curve. The motors are driven from a motor-generator set. In order that the paper may be wound into rolls of uniform hardness from the center to the outside, the two driving motors are adjusted to develop different predetermined relative torques. In order to maintain a constant tension in the sheet between the supply roll and the winder, an auxiliary generator is mounted on the shaft of the supply reel. This generator drives a series motor, which in turn drives a direct current generator connected in parallel with the generator driving the winder-drum motors.—A.P.-C.

Paper Slitter and Winder. George Lamoureux assignor to Rice, Barton & Fales, Inc. N. S. pat. 1,770,161, July 8, 1930.—The invention provides for a web-supporting means, such as a slitter board that is movable toward and away from the slitters so that the sheet while travelling may be engaged with the slitters or supported in a position removed from them. Guides are provided on the slitter board to prevent displacement of the sheet transversely of the machine. A movable slitter-guard is also provided to prevent contact of the hands of the operator and of the sheet with the cutters at times when the sheet is removed from its position for engagement with the cutters.—A.P.-C.

Paper Winder. George Lamoureux assignor to Rice, Barton & Fales, Inc. U. S. pat. 1,770,162, July 8, 1930.—The essential feature of the invention lies in the fact that the roll being wound can be begun in one position, and later shifted to another position, without stopping the machine where the winding is continued. This permits of removing the completely wound roll and starting the winding of a new roll without having to stop the machine.—A.P.-C.

Drive for Paper Machine Driers. Bernard A. Malkin. U. S. pat. 1,769,355, July 1, 1930.—The drier section is divided into a number of small groups, each of which is driven by a separate motor. The only synchronizing means is the drier felt, so that the felt tension is controlled and the drier speed conforms to the natural shrinkage of the felt during the drying, and as this shrinkage conforms to the natural shrinkage of the paper, a stronger sheet results and fewer breaks occurs than where the speed of all the drier rolls is uniform.—A.P.-C.

Paper-Trimming Machine. Paul Perhats and Frank Perhats. U. S. pat. 1,769,602, July 1, 1930.—The machine, which is mounted on a single casting, comprises an adjustable table for supporting the paper, four stationary adjustable knives, one for trimming each edge of the sheets, and a pair of clamps for compressing the pile of paper during the trimming operation. The compressed pile of paper is fed through the space enclosed by the four stationary knives, so that the four edges are trimmed in a single operation.—A.P.-C.

Apparatus for Handling Webs. Arthur M. Daniels assignor to L. L. Brown Paper Co. U. S. pat. 1,773,709, Aug. 19, 1930.—In the handling of delicate webs, such as tub-sized paper which has been wound wet, the supply roll is driven so that its peripheral speed is maintained practically the same as that of the first drier rolls, and just sufficient tension is retained to obtain proper feeding to the driers.—A.P.-C.

Slitter Drive. Leon L. Dupuis and Edward H. Vicary. U. S. pat. 1,774,133, Aug. 26, 1930.—In order to eliminate the trouble ordinarily produced by vibration of the slitter shafts on wide machine, each slitting cutter is mounted on an independent arbor or shaft and is driven by an individual motor. The motors are constructed so that they can be started and stopped from a distant point, and so that either a quick or a coasting stop may be made, the quick stop being accomplished by the utilization of electric current for dynamic braking.—A.P.-C.

Process and Apparatus for Regulating Paper Stock. Charles V. Proctor. U. S. pat. 1,774,566, Sept. 2, 1930.—The invention provides means for measuring the ingredients used in making paper and for changing the proportions of the ingredients before they are mixed. The ingredients are fed under pressure into reservoirs with overflows allowing the excess material to return to the main container. A measuring chest is attached to each

of the reservoirs, which are built on inclines with moving gates arranged so as to allow the ingredients, when the outer gate is closed and the inner gate open, to flow into and fill the measuring chest, and to flow out of the measuring chest when the inner gate is closed and the outer gate is open. The ingredients from the several measuring chests flow into a common mixing chest. The gates are opened and closed automatically and timed by an arrangement of gears and pinions, the pinions being connected to crank shafts and the latter to the gates by means of connecting rods. In each measuring chest there is a plunger which is adjustable to increase or decrease the capacity of the measuring chest at different positions of the plunger. Each measuring chest is provided with an air vent to avoid trapping and compression of air as the chest fills, and avoid vacuum as the chest empties. Special gears and pinions are arranged so as to time the action of the gates, and are provided with special cogs to give the gears and pinions additional strength at the beginning of their operation.—A.P.-C.

Consistency Regulator. Hervey G. Cram assignor to Great Northern Paper Co. U. S. pat. 1,770,589, July 15, 1930.—The purpose of the invention is to provide means for automatically maintaining the consistency constant in broke beaters operating in connection with paper machines. Dry broke is fed directly into the broke beaters in the paper machine room basement, through slots in the paper machine room floor at the driers and calenders. A feeder or rider plate, normally resting on the sheet passing from the calender to the reel, controls a valve which ti automatically opens when the sheet breaks; a spray of water is thus directed against the broke as it falls through the slot in the floor into the broke beater. The slope and level of the surface of the stock flowing down the incline from the backfall depends on the consistency. The regulating apparatus consists of a stock contacting member (e.g., a piece of two-inch hose having the end in contact with the stock plugged), the position of which regulates the opening and closing of a valve in the pipe line through which water is supplied to the beater.—A.P.-C.

The Thyle Consistency Control. H. L. Rammer. Paper Trade J. 91, No. 21:51-53 (Nov. 20, 1930).—A brief description of the principle and operation of the Thyle consistency regulator, with a brief discussion of its merits.—A.P.-C.

The Paper Making Machine. Roy F. Hayes. Mill 53, No. 45, 20-24 (Nov. 8, 1930).—An outline of the development and improvement of the paper machine from its invention by Louis Robert, in 1799, to the present day.—A.P.-C.

Mulch Paper Machine. Anon. World's Paper Trade Rev. 94; 2218 (Dec. 19, 1930).—A brief illustrated description of the Hallna machine in the Vedène mill of Papeteries Navarre, France, for the production of mulch paper by simultaneously waterproofing and fertilizing the paper by a "setting" process and without subsequent frying.—A.P.-C.

Fourdrinier Wires. William E. Buchanan. Paper Mill 53, No. 52: 4, 26-27 (Dec. 27, 1930).—A discussion of the meshes used for the various grades of paper, of some causes for wire replacement, and of recent developments in the manufacture of wires. —A.P.-C.

Suction Box for Paper Machines. Usines Ch. Catala, M. Catala and A. Huart-Catala. Belg. pat. 368,822, (April 30, 1930).—An endless travelling wire is interposed between the top of the suction box and the felt or wire carrying the wet sheet.—A.P.-C.

Process for Producing a Substance for Obtaining a High Gloss and Pure White Color on Paper. Heinrich Körber. U. S. pat. 1,776,002, (Sept. 16, 1930).—A soluble salt of a heavy metal, such as zinc sulphate, is added to a solution of saponified stearin, and the resulting precipitate of insoluble heavy metal soap is sequent drying.—A.P.-C.

The Wear of Machine Wires. James Strachan. Paper Maker & Brit. Paper Trade J. 80, 465-466 (Nov. 1, 1930); Paper Mill 53, No. 48: 4 (Nov. 29, 1930).—The main factor producing the direct wear of paper machine wires, even in the manufacture of fine papers, is shown to be the presence of grit and sand too fine to be caught in the sand traps. The total sand from the raw materials alone circulating on the paper machine can easily amount to about 135 particles per square inch of paper formed on the wire in the case of newsprint loaded with china clay and of sulphite printing paper, also loaded with china clay—A.P.-C.

Paper-Trimming Device. Wilbert G. Fritz and Fred Fritz, U. S. pat. 1,777,791 (Oct. 7, 1930).—A roll having a set of teeth placed circumferentially near one end is mounted in a frame parallel to a roll having a groove for receiving the teeth. The rolls are geared together and are mounted so that the distance between them can be varied by means of adjusting screws.—A.P.-C.

Method of Embossing Fiber Sheets. Leopold Oxhandler. U. S. pat. 1,784,906 (Dec. 16, 1930).—The sheet is passed, while saturated with moisture, through embossing rolls, so as to force separated areas of the sheet bodily out of the plane of the sheet. At least one surface of the paper is separated from direct contact with the corresponding roll by the interposition of a thin flexible sheet.—A.P.-C.

Stock Inlet for Paper Machines. Richard T. Lang assignor to American Voith Contact Co., Inc. U. S. pat. 1,775,905 (Sept. 16, 1930).—The bottom of the stock box has a longitudinal groove, back of and parallel to the outlet through which the stock flows on to the paper machine wire. A perforated roll is mounted in the recess, and a vertical baffle plate is mounted over and parallel to the roll, so that the stock must pass through the perforated roll just before it is delivered on to the wire.—A.P.-C.

Calender Roll. Archibald Lade assignor to B. F. Perkins & Son, Inc. U. S. pat. 1,785,265 (Dec. 16, 1930).—The roll is built up of sheets of paper and asbestos, mounted on a metal shaft and pressed together and held in position by means of flanges at opposite ends of the shaft.—A.P.-C.

Variable-Speed Sectional Drive for Paper Machines. Frank O. L. Chorlton. U. S. pat. 1,776,886 (Sept. 30, 1930).—Each section is driven from the main driving shaft through an epicyclic gear comprising a driving element, keyed to the main shaft, and pairs of pinions mounted on a revolving frame or box, one pinion of each pair being in gear with the driving element and the other pinion of each pair being in gear with a gear wheel around the driving shaft. Cone pulleys of equal size are oppositely mounted on the driving and second shafts, the mid-position of the belt corresponding to the movement of the gear as one piece. Motion is transmitted from the sleeve on the main shaft to a gear on the shaft of the paper machine section by means of a worm on the driving shaft, the sleeve of the worm being in clutch connection with the above-mentioned loosely mounted sleeve.—A.P.-C.

Electric Drive for Winders. J. W. Corey. Paper Ind. 12; 1404-1405 (Nov. 1930).—A description of an electric drive, consisting of an electric motor connected to each winding drum and to the slitter, and suitable for both four-drum and two-drum winders.—A.P.-C.

Power House

Steam and Gas Turbines and Reciprocating Machines. E. A. Kraft, Papier-Fabr. 29, No. 3: 39-41 (Jan. 18, 1931).—The production of steam turbines, steam relation, steam quantity, and construction discussed. Intermediate heating, preheat bleeder, back pressure and bleeder turbines, turbine cost, cost of the combustible materials, capital invested. Efficiency factor, hours in operation. Reciprocating machines, experiences with high pressure machines, economic division between reciprocating machines and turbines. Gas machines and gas turbines. The future use of high pressure installations and the ever larger turbines seems promising. Since a high initial steam temperature is cheaper to attain than an intermediate heating, it is to be assumed that the progress will be towards higher steam temperatures.—J.F.O.

Concerning the Advance in Grate and Firing Arrangements, and the Results of Tests Made on Modern Boilers. Reinhard

Schulze, Wochbl Papierfabr. 61, No. 46: 1464-1468 (Nov. 15, 1930).—By means of numerous data and descriptive drawings, the author describes the advances made in boiler design.—J.F.O.

Power and Heat Economy With Special Reference to the Relation to the Pulp and Paper Industry. Hater. Papier-Fabr. 28, No. 35: 549-557; No. 36: 568-572; No. 37: 584-7 (Aug. 31, 14, Sept. 7, 1930).—Powdered coal versus grate steam boilers with the advantages and disadvantages of each given in detail. The steam pressures to be used, when and why. In a pulp and paper mill the pressure should be higher than that used in a plant using a condensing turbine and lower than a mill using a pure back pressure turbine. The costs of boilers of various steam pressures is discussed. A description of high pressure boilers, such as, Loeffler, Atmos, Benson, and Schmidtschen. The Benson boiler is designed for 224 atmospheres.

Water softening systems are described. The different types of turbines and their specific use are discussed. Steam accumulators, their construction, use and advantages, as well as an explanation of the two main types, namely, gradient accumulator, "Ruths" and the equal pressure accumulator with the most suitable application for each type. In conclusion measuring and control instruments are discussed.—J.F.O.

Process for the Chemical Cleaning of Boilers, Surface Condensers, and Similar Apparatus. Wilhelm Baumann and Heinrich Baumann. Ger. pat. 503,890 (April 14, 1926).—The solvent is forced through the boiler to be cleaned by means of compressed air. A tank containing the solvent is provided in which the solvent is in constant circulation to and from the boilers.—J.F.O.

Design and Hook-up of Steam Turbines for Pulp and Paper Mills. A. Renfordt. Wochbl Papierfabr. 61, Special No., 24-33 (June 25, 1930).—The design and hook up of steam turbines for pulp and paper mills is strictly apart from turbines purely for power installations. In pulp and paper mills using a condensing turbine, it often pays for itself in two years to install a non-condensing or bleeder turbine. Boilers operating at high pressure have a pronounced influence in increased efficiency when using a non-condensing turbine. The author describes several installations in pulp and paper mills and shows by a series of curves and diagrams the advisability of installing bleeder turbines or non-condensing.—J.F.O.

Meeting of the Berlin Section of "Der Verein der Zellstoff- und Paper-Chemiker und-Ingenieure." Wochbl Papierfabr. 61, No. 20: 636-638 (May 17, 1930).—A paper was given by Hater of the Bergmann-Elektrizitatswerken A.G. over power and heat economy with special consideration to the pulp and paper mills. Powdered coal versus grate firing, condensing and back pressure turbines, steam accumulators, feed water treatment, etc. were thoroughly discussed.—J.F.O.

Stoneware Pumps, "Steinzeug-Membran." Wochbl Papierfabr. 61, No. 20: 642 (May 17, 1930).—A description of a stone ware pump, protected by German patent 493,997, for pumping all kinds of strong acids, bases and sludges is given. Also the method of starting up, as well as sizes and other operation data are given.—J.F.O.

Influence of the Load and the Variation in the Load on the Efficiency of Boilers. Kruger. Papier-Fabr. 28, No. 20, 340 (May 18, 1930).—The efficiency of steam boilers is greatly impaired by variations in the load. Local conditions are given as the cause of the great difference in rated efficiency and actual efficiency. Improvement in heat economy is very important for boilers which are in constant operation under a high load. The improvement in heat economy is not so important for boilers which operate intermittently and with partial load. For this class of boilers the amortisation, interest and upkeep is of more importance and hence as cheap a boiler installation as possible should be used.—J.F.O.

Flue Dust from Recent Combustion Methods, Technically, Economically, and from a Purely Practical Standpoint. Kruger. burner gases in sulphite mills.—A.P.-C.

Papier-Fabr. 28, No. 27: 455-457 (July 13, 1930).—A discussion of the means to eliminate or diminish the ash going through the stack, by the electro static (most suited for fine light ash), the dry mechanical method, the wet mechanical and a combination of the dry and wet mechanical methods. About 90 per cent of the ash is removed through centrifugal force in the dry mechanical method, providing the ash is not too fine. The wet mechanical method is in itself cheaper, but has the disadvantage that the sulphur dioxide gas dissolving in the water causes corrosion in the systems.—J.F.O.

Keeping the Heating Surfaces Clear to Increase the Efficiency of Steam Boilers. Kruger. Papier-Fabr. 28, No. 24; 403, (June 15, 1930).—The causes for the formation of incrustants and scale on boiler tubes and the methods for its removal are given. Lime and soda treatment, permutite, Cumberland electric process, etc. are mentioned.—J.F.O.

Flue Gas Elimination by the Wet Method. Pradel. Papier-Fabr. 28, No. 21: 353-356 (May 25, 1930).—The smoke nuisance, especially in large cities, is an evil which should be eliminated. Now more than ever, since powdered coal is used as a fuel which means that a large percentage of the ash goes up the stack with the flue gas. Electric flue gas purification is expensive, better systems are those with baffles and water showers. A detailed description of these gas purifiers is given including their advantages over other methods.—J.F.O.

The "Loffler" High Pressure Boiler. Kruger. Papier-Fabr. 28, No. 17:291-292 (April 27, 1930).—In the strife for higher efficiency, boiler temperatures and pressures have been raised, which necessitates in turn a very high grade of feed water. The principle of the "Loffler" boiler is that the evaporation occurs outside the boiler, in an evaporating drum. Superheated steam is introduced into this drum which brings the water to the evaporation point. The steam removed from the boiler goes to the superheater where it is heated to 500° C and here it divides, part returning to the boiler and the remainder is used for power, etc. The boiler is essentially a high pressure type, operating most efficiently at one hundred atmospheres.—J.F.O.

Make Up Water With Surface Condensers. Kruger. Papier-Fabr. 28, No. 23:387 (June 8, 1930).—The addition of make up water required in steam turbines with surface condensers runs between 4 to 8 per cent. The causes for the loss in steam are enumerated.—J.F.O.

The Utilization of Waste Wood for Steam Generation. A. R. Smith. Combustion Engineering Corp., New York. Pulp Paper Mag. Can. 31:33-35, 58 (Jan. 8, 1930).—The established methods of preparation (hogging) and moisture removal (pressing and drying) of wood refuse fuels are described, and the relative efficiency and economy of hog fuel as compared with coal and oil is discussed.—A.P.-C.

Drying Wet Bark is First Step in Burning Wood Refuse. Pulp Paper Mag. Can. 30:620, 628 (Nov. 27, 1930).—A description of the Pehrson rotary drier and its operation, with a brief discussion of its merits.—A.P.-C.

Chromium Plating in the Paper Industry. D. H. Bissell. Paper Ind. 12:1397-1399 (Nov. 1930).—An outline is given of some of the many interesting and highly successful applications of chromium plate, particularly on equipment used in paper manufacturing.—A.P.-C.

Handling Bark Refuse. Paper Ind. 12; 1400-1402 (Nov. 1930).—An illustrated description of the bark-disposal system at the Sheet Harbour, N. S., mill of the A.P.W. Pulp & Paper Co., where the bark is pumped to a lake about 3000 feet distant from the mill.—A.P.-C.

Obtaining Efficiency by Careful Selection of Recording Instruments. W. O. Hebler. Papier Ind. 12; 1402-1403 (Nov. 1930).—A brief discussion of the importance and advantages of continuously recording the sulphur dioxide content of sulphur burner gases in sulphite mills.—A.P.-C.

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The Major Problem Created by Machine Age*

By Arthur Andersen, Arthur Andersen & Co., Chicago

On the several occasions in which I have appeared before the National Association of Cost Accountants, I have always felt the urge to speak freely and perhaps a bit philosophically on certain important phases of business. This is largely for the reason that I believe in this organization there is a real breadth of viewpoint and a depth of understanding in respect to the fundamental conditions upon which all business rests.

That wonderful film, "Power in the Making," which has just been thrown on the screen for us brings home the tremendous mechanical development that has taken place in this country in perhaps the last decade or two, with greater emphasis in the last decade. Many of us are inclined to accept this growth as a natural thing, and we fail to realize that for an industrial civilization to continue to exist, it must continue to serve mankind in the broadest possible sense, which is the purpose of all civilization. We fail to take into account the dangers which may be inherent in the rapidity with which these machine changes are brought about. Therefore, I think I can say that business statesmen should be far more concerned today with the broad meaning of the unemployment situation that exists than with merely the immediate means of relieving the effects of this unemployment. The depression itself, of course was not solely and wholly attributable to the unemployment situation any more than unemployment results solely from the depression. There are many other collateral things which have entered into it, one of which is undoubtedly the drop in the value of silver. But as against all the factors that have been brought before us as accounting for the extreme conditions of unemployment, I think we can lay our finger on the one single outstanding condition, namely, the intensive development of mass production.

It has been said that all things carry within themselves the seed of their own destruction, and in the past year I have been wondering if this is true also of our present industrial system. I speak not as an economist, a statistician or as a radical, but rather as an interested eye-witness of events that cannot help but have profound meanings. For over a year the air has been thick with subjects of discussion. Bankers have dealt with matters of national and international credits, trade balances, gold movements and so on. Economists have pondered over the means of interpreting and correcting cyclic movements. Manufacturers have had their problems of excess capacity, keen competition, declining commodity prices and revision of costs. But all men have had one subject of discussion in common, namely unemployment.

If there is a germ of destruction within our present industrial system, it is that of the growing element of unemployment. It has been said that the most beautiful thing in the world is youth, and a pity it has to be wasted on children! But in my opinion nothing is more beautiful than a steady job, and that usually becomes more valuable as the age of its possessor increases. It is increasingly difficult for men who have crossed the 40 year line in age to find jobs, or make new connections. Unemployment itself is a simply defined thing. It consists merely in a lack of work for one who desires to work. The complex factors enter in when one seeks the causes of unemployment and the results of unemployment. Basically there are four types of unemployment which may be defined in terms of fundamental cause as (1) Residual (2) Cyclic (3) Social and (4) Technological, which is a word of more recent coinage. The last named is the type which seems to me to be the most dangerous, for it is truly created by the present machine age and if not checked by intelligent action will continue to grow in volume and in evil effects.

Residual unemployment is that which has been always with us and probably always will be. It is produced by restlessness and unfitness. It is that due to an interval between jobs. Normally, it is of small percentage, is not particularly harmful, and is not susceptible to any present practical control.

Cyclic unemployment is that which appears in times of industrial recession and is the type which is most evident. It comes about because of a diminished production which is usually the aftermath of overproduction. I have little patience with the view that in a country like this we must have our depressions in order to continue to go forward. In other words, if these depressions are a necessary consequence of prosperity, then are we not paying much more for prosperity than prosperity itself is worth. These industrial cycles have occurred very definitely in the past hundred years, with elements of almost uncanny time regularity. They have been the subject of voluminous study and analysis and everything about them is clearly known, except how to prevent their recurrence. Such unemployment is regarded as almost inevitable but is, on the long scale, temporary. It is to relieve cyclic unemployment that thought is given to unemployment insurance, to working men's doles, and so forth. I believe the American workingman does not want paternalism, yet always it seems

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that more thought is given to lessening the ill effects of cyclic unemployment than to preventing it.

Social unemployment is the name I have given to the lack of work caused by the increased efficiency of workers when they are massed together for productive purposes. For example, ten men might be engaged in making shoes entirely with hand tools and hand labor and their average output may be one pair per day per man, when each man performs every operation on one shoe. If the ten men are grouped together, each performing certain operations on all shoes, the increased dexterity of operation may result in a total output of fifteen pairs of shoes per day. Obviously, in this case the potential employment of five more men is lost, which may be classed as social unemployment for that five. A more practical present day application of this is seen in the operation of packing plants, where there is a tremendous percentage of hand labor with simple tools, but where high efficiency is attained by the subdivision of operation, the careful planning of the work and the large volume of material consecutively handled without lost time.

Closely allied to the factor of social unemployment is that of technological unemployment. It is caused by the increased efficiency of workers when they are provided with proper machine tools. It may be very simply illustrated by the fact that one man with a steam shovel replaces 100 men with shovels. It is very intricately illustrated in any one of our modern factories, where, by the use of standard and special tools, of conveyors, of automatic machinery, of subdivision of operations, of carefully planned routine, the per man output per day may be as great as the per man output per year might be otherwise. It is extremely difficult to evaluate all of the factors of technological unemployment, for there are tremendous compensating elements. Thus, under the machine system, it is possible to make things which could not possibly be made under the hand labor system and so employment in huge amounts is created.

Social unemployment and technological unemployment thus go hand in hand. Machine methods of production could not very well be effective without the social grouping of workers, and social unemployment would have little consequence were it not for the reenforcing effect of technological unemployment. Thus, it is possible to consider social unemployment as an integral part of the former. Similarly, it is difficult to disassociate this from a pronounced effect on the other two types of unemployment. Tremendous machine development permits tremendous output, and the overgearing of production thus possible permits accumulation of stocks and may result in cyclic unemployment. In times of activity the demand for increasing output requires that there be effective machine operators, but as demand falls off, there is sterner competition, costs become important, personnel requirements are tightened, and the general tendency of American Industry of the better managed companies is to make closer and more careful study of personnel requirements, and translated in terms of individual function, they not only study present capabilities but they go back into heredity to determine all the factors. In other words, the demands that are to be made upon the coming generation with respect to measuring up to higher standards of everything will be far beyond what you have witnessed in our generation and, of course, ours is correspondingly higher than that required of the preceding generation. Personnel requirements are tightened and only the most efficient, younger and more physically fit of the workers are desired. Dexterity is demanded rather than skill. Therefore, larger numbers of the semi-unfit are rejected and residual unemployment increases. Truly, technological unemployment is the major problem created by the machine age!

It may be questioned just how real this bogey is. For an answer one needs only to turn to data compiled by the Federal Reserve Board, recently published, showing the volume of manufacturing production and the corresponding number of employees for the past 30 years. If the output per employee is taken as being unity in 1899, then the output per employee was approximately 1.63 in 1929, and despite increased output and the effort to maintain employment was still 1.42 in 1930. In other words, two men today can produce the output of three men in 1899. Unfortunately, this comparison does not begin to tell the whole story, for practically this entire change has taken place in the last ten years. It is interesting to note the years taken to bring about the development in the generation of power, as illustrated in the movie that we saw tonight. Despite our tremendous volume of manufacturing in 1929, there were less actual employees in that year than there were in 1917, 1918, 1919, 1920 or in 1923.

It is, of course, easy to say that as men are released from one class of industry by improved effectiveness of equipment, they are absorbed by some newly developed industry. This has been the "luck" upon which we have rested so far. The old "machine fear" has been held by labor for more than the past hundred years and in specific instances has led to riots, strikes and destruction of equipment, and more passively to restricted output and "soldiering," but thus far there has been no drastic culmination of the replacement of men by machines. This is because the machine factor has, to a considerable extent, always carried with it a twin factor which tended to nullify the possible evil effects of machine production. The human ingenuity which has made machines possible has also succeeded in devising new things for machines to produce. In the last century one new industry has followed another in a procession of miracles, so endlessly that one ceased to expect an end. Now, we must give thought to the possibility of a continued ingenuity in the development of machine processes, with a slackening in the devising of new products.

Perhaps there are devices for human use far beyond the realm of present imagining, yet the rate of increase in new devices cannot be maintained. The necessities of the human race are fairly simple in their broad classification, and in the past, luxuries have been converted industrially into necessities. In the order of their importance and of their development, our necessities are food, shelter, clothing, transportation and amusement. The basic elements of the first three have long been developed and are now subject only to refinements. The factor of transportation really has only been developed industrially in the past hundred years, and our railroads, steamship and automobile industries are partial indices of its importance. They also are partially by-products of the necessity for amusement, while the phonograph, radio and moving picture industries indicate how seriously we take our amusements. Thus two of our five necessities are only recently of large development. Communication is a part of transportation and a part of amusement, so to the industries already noted may be added our telephone and telegraph systems and a good part of the printing industry. It would appear that practically the major part of our present industrial activity is devoted to our two recently acquired necessities. Can anyone suggest where we may find two or three new necessities to take up the

slack in employment created by a more perfected mechanization of those we now have?

While these basic facts of technological unemployment have been evident for the past several years, their importance has been obscured by a decade of industrial prosperity where employment has been created by the artificial stimulus of credit and nothing more and nothing less. Now, when the pinch has come, they reveal their influence. Recently a prominent economist stated "The development of a new industry to absorb large numbers of workers, as did the automobile business ten years ago, is unlikely in the near future. * * * The long term trend of factory employment, especially in the industries where the machine predominates, is downward." Similarly, the editorial comment on a recently published book significantly states, "It emphasizes the increasingly important problem of unemployment in prosperous times rather than during business depression." These and similar comments indicate the truth of the idea that man does much constructive thinking in times of adversity.

This trend of comment indicates that thought is being given to an analysis of the factor of unemployment in relation to the whole scheme of industry. But, in addition, there are various stray literary sparks which indicate that thought is being given to the constructive answer to some unemployment problems. Thus, from a publication of the United States Chamber of Commerce comes the comment, "The acceptance of the theory that prosperity is contingent upon the continuous employment of virtually the entire working population places a large share of the responsibility for stabilizing employment squarely upon the management of industrial enterprises." If there is any criticism of American business, it lies in this direction, as I see it, namely there has been an inability to recognize this rather important and serious trend which in itself would inevitably create problems that would call for the greatest brains that this country can produce in the way of business statesmanship. From another source we hear, "It is time that our much vaunted industrial supremacy took account of its own shortcomings and paid as much attention to the unemployment of labor as it does to the unemployment of capital." That sounds like a socialistic statement. It is not anything of the kind. It means merely that the capitalistic principle, which probably is the only satisfactory method of working out the problems of all of the peoples of the world, must be modified in order to meet changing conditions, in order to discharge its responsibility, not only to the capitalists, to whom it must look for leadership, but also to the large majority of workers that make up in part the capitalistic system.

Another editor believes that: "Work should be shared among many employees during depression periods rather than dismiss a portion of the working force." Less technical, and therefore less obscure, is the comment, "Every worker, almost without exception, when he starts discussing unemployment, declares emphatically, even vehemently, that the remedy is the shortening of the work week, also the day."

The present critical aspects of the problem of unemployment have been largely brought about by the speed with which conditions have been changed in the past ten years. This speed was in part caused by the intense stimulus to production brought about by the war (both war and postwar). In other words, many of us failed to realize that the condition which led to the prosperity of 1919 was really an accumulation of necessities which could not be met during the war and that as soon as the war was over we started out to fulfill these requirements. What were they? Buildings, concrete roads, automobiles, and many other things. That was the basis, to start with, of the intensive manufacturing demand which existed following 1920 and 1921 and made up in a large measure the period of prosperity that then followed. Perhaps also the depression of 1921 caused a lot of constructive thinking and planning on the part of our masters of industry. Another factor, of course, has been the injection of a huge volume of credit in this period to permit radical change in manufacturing equipment and methods. A subfactor in the problem has been the injection into industry of an increasing number of women workers.

This latter phenomena has been variously interpreted. Some lay it to the necessity for women workers when man power was depleted by the formation of huge armies. Some class it as a psychological trend, "The new freedom of women," women desiring recognition of economic parity with men. Both of these forces have probably had a share, but the real factor is that of our old enemy, technological unemployment. That is, woman's original work in caring for the home has been tremendously decreased by the benefits of the machine age, and women thrown out of employment in home care have sought employment in other fields. Machine assistance to home care must not be interpreted merely in terms of washing machines, vacuum cleaners, electric irons and other direct aids, but must include the indirect effect of our huge textile industries, the clothing industry, baking industry, canning and meat packing industries, and so forth. It must also include the effect of electric light and power, of automobiles, of improved home building and heating, and of the effect of apartment and hotel life. The old adage that woman's work is never done can now almost be translated to mean that nowadays it is never done by the woman herself. Of course, the usual compensating factors have appeared in that the textile and clothing industries provide employment for hundreds of thousands of women, that innumerable women clerks are required in distribution, that use of automobiles by women in their spare time has led to larger growth in that industry and perhaps even that there is greatly increased production in bridge tables and playing cards. The sum total, however, is an increase in technological unemployment.

On the other side, factors have been at work which have tended to minimize the growth of unemployment. Our improved standards of living and other elements have led to legal regulation of child labor, thus eliminating some workers. They have led to compulsory education, thus providing for a greater number of educational workers and to employment in the construction of school buildings. Voluntary education, possible by greater per capital wealth, leads to the existence of 800,000 students in our colleges and universities who are consumers but not producers. There has also been a trend toward shorter working hours per week, not from recognition of any distinct economic law, but largely for physical, social or psychological reasons.

Unemployment in any form is a problem created purely by our social structure. If we may think back to prehistoric times when man existed as an individual, when necessities were the simple stark matters of food and shelter, it is evident that there was no unemployment. If man was hungry, he sought food. If this employment did not net a sufficient return, he died. Only the capable workers survived. The first social order of mankind probably had to do with the matter of protection, which is one element of shelter, and is man's second necessity. It is probable that industrial co-operation was an almost immediate

sequence as men found that food and shelter could more readily be procured by group effort than by effort of a lone individual. Still there was probably no unemployment, but the ground for unemployment was laid since where there are group resources there are always possibilities of charity.

In these first social groupings and, in fact, wherever the social grouping is small, it is difficult for unemployment to exist. In the days of early settlement in this country, mankind had advanced far in mentality, in civilization and in equipment; yet primitive conditions of necessity existed. In those days the old law was asserted by Captain John Smith when he stated, "Those who won't work shan't eat." There is an individual consciousness as distinct from a state consciousness, since the burden imposed by any unemployment was instantly felt and directly translated into increased effort of other individuals.

Now, however, the burden is more intangible. By reason of our present social structure, the individual always carries a large indirect burden. As a nation or a state, we support the insane, the feeble, the criminal, and hundreds of thousands of industrially unfit. That is merely one penalty for civilization. It is a by-product of civilization. A different form of burden is imposed by the necessity for protection, for legislation, for administration, for education, for streets, roads, libraries and what not. How many people are thus indirectly employed to the benefit of the state as a whole in this country I do not know. Our friend Benito Mussolini has, however, taken an exact census of the number in Italy and gives the figure at 527,-769. This country has three times the population of Italy, so if the ratio holds, we have around one and one-half millions of State servants. I am inclined to think there are more than that number. Certainly, we have more than that ratio in the city of Chicago.

In Italy there are now 533,000 unemployed so if these are added to the State employees, it is found that each group of 20 workers, or perhaps less, must support at least one man who is not productively engaged. In the United States our figures on unemployment are much greater. There are between six million and seven million idle. If state employees and our industrially unfit are added, I believe that right now each group of five workers is supporting one person not productively employed. This is in addition to women, children and aged who constitute a family rather than a State responsibility.

I have no intention of lumping the industrially unemployed with the million or so who are state employed or the other million or so who are industrially unfit. The above combination of figures is merely a cold presentation of the fact that it is possible, by reason of our social organization and our industrial efficiency, for five workers to replace fairly adequately the productiveness of six. In other words, we are as a nation, and perhaps as a world, too effective.

The factor of productivity is made up of the two elements of effort and time. Now, if effort is too productive, the element of time must be decreased. If five men, working 54 hours a week, can meet the constructive requirements that should be spread among six men, the simple mathematics of the problem is that six men could work only 45 hours a week.

There is not the slightest doubt that the above statement is so elementary that every statistician, economist, sociologist, or even every thinker in the country will be able to rise up with loud and probable objections to the idea. Many will claim that there cannot be too much production since man is a creature of limitless desires and if given the opportunity, will accumulate and use an inexhaustible volume of material goods, which, of course, he cannot do. Thousands of us know that we can eat about so much or we can drink about so much. We can wear about so much and our physical needs are not nearly so great as we are sometimes led to believe. If there is any releasing of time as the result of the further development of the machine age, it should be used largely in a cultural application of leisure time which certainly does not address itself solely and wholly to consuming more material goods. Of course, mankind as a whole can consume more than it now does if the opportunity exists, but unless mankind becomes 100 per cent socialized, with all human efforts merged for the common good and equitably redistributed, there can be no approach to a general realization of desires. The nearest approach that is possible under our present economic system is to give each individual the opportunity to earn in proportion to his ability. At the present moment there are millions of people in this generally prosperous country who do not have the chance to work. There is nothing for them to make which will have a proportionate value in a country, which, according to economists, is suffering because there is too much of everything.

Theories for the cure of this situation are many and varied. One idea is that if every one should be gainfully employed, receiving good wages, the resultant earning power would mean resultant spending power which in turn would support the increased productivity created by the increased employment. This may be called the "wheel within the wheel" theory and almost approaches the principle of perpetual motion. The difficulty seems to lie in the fact that the people and the activities of the United States cannot be sufficiently insulated from the rest of the world to permit an ideally frictionless rotation of this sort. As the tempo of the wheel increases, credit and money tend to flow out of the country and so does production. We are geared up not only to meet internal consumption but also a part of world consumption. If world ability to pay for its share of consumption is then restricted, the wheel is slowed, so overproduction occurs before the spinning can be slowed to the newly balanced rate. A similar effect can be produced if for any reason there occurs a recession from the standard rate of demand for any one product. Thus if production is geared in accordance with the fact that an automobile needs replacement each five years, then production of cars of an improved type, which will last for seven years, will lead to a two year slowing up of production. But if any one element of production slows up, the entire wheel must slow up.

Such irregularities prevent control of the industrial wheel. For example, all industry has been used to the fact that iron and steel eventually disintegrate into rust and must necessarily be replaced by newly produced metal. Now, if the use of a rustless steel becomes universal, which need never be replaced by new metal production, can anyone calculate the actual effect on industry?

Such an effect is obtained also from an entirely different cause. If in our industrial wheel the speed has been set by the fact that 100 men are required to give a certain volume of production, consider the result when improvement of machine processes permits 70 men to give the same unit production. Either production must increase, for which there is no corresponding consumption, or consumption must be stimulated or else 30 men stand idle and must be supported in idleness by the remaining workers. It is very evident that too many factors are continually busy influencing industry to permit of any real nicety of its regulation.

Added to what may be called the normal fluctuations of

industry are those which are highly artificial but none the less profound in their effect. The most disturbing of these are the ones caused by manipulation of credit. Basically, all that any man can contribute to this world of life is labor. His labor may take any one of an infinite variety of forms and may have a widely varying value. Moreover, its value may be gauged on two different bases —that which it appears to have at the time it is expended in the eyes of his associates and that which it has on the long time scale to humanity which, of course, is the sustaining value. A poet may die of starvation while succeeding generations loudly proclaim the beauty of his works. An Emperor may live in splendor and be cursed down the ages for the destruction he wrought. Industrially speaking, we are concerned with the value of labor in terms of current exchange. For labor is traded for labor; money is a medium to facilitate this exchange; and credit is the anticipation of labor not yet performed.

Thus labor can be stored, both before and after its creation. When a man borrows a thousand dollars, he anticipates his ability to make it produce a profit for him. In effect, he uses the stored labor of others to augment his own, securing a mass advantage. The difficulty lies in telling whether credit represents stored labor or anticipated labor. If it is undeniably stored labor, we claim that it is sound credit. If it verges into the field of anticipated labor, we call it inflation. It is because credit may thus depart from the field of actualities that it complicates the economic situation.

In the past ten years credit has had a tremendous influence because it has been used in such tremendous quantities. When the United States loaned money abroad, or extended credit, it, in effect, transferred a lot of labor hours which immediately started to work making goods in competition with our own production. It has seemed in many cases that this country loaned money to other countries in order that they might be able to buy goods from us. By use of these goods they increased their own productivity. This productivity may eventually enable them to repay the loans but in the meantime our own outlet will become more and more restricted and our idle plant capacity will impose heavy fixed charges, while our workers will be idle. For instance, what are we going to do in the shoe industry where we have a plant capacity permitting the production of nine hundred million pairs of shoes a year, when the consumption in the United States is only three hundred million?

Of course, it is dangerous for me to depart from my topic of unemployment into the field of economic and financial theory, but dollars and labor hours are in my eyes one and the same thing. If we make the dollars work hard in the form of improved equipment, the labor hours need be fewer. And if certain economic conditions cause the dollars to be idle, they should also cause workers to be idle.

At the present moment there need not be so much concern because dollars are lying idle, for they cannot starve. But when workers are idle, they must be supported in some fashion. Perhaps too much attention has been paid to making the dollars earn a profit and too little to the profit of the workers. That sounds socialistic, doesn't it? To me it is just business sense, and the readjustment of this problem in its final analysis is going to call for the best business ingenuity that can be found upon the part of leading business men. Now, after all, success in business can only be true success if it is translated into terms of success to the whole social order. No one of us can isolate himself, single himself out and call himself independent, act independently of the rest of the world. After all, we are only small cogs in this whole scheme of mechanism that goes on endlessly and endlessly. It is but a short journey that we have on this earth in which we must do the best we can for those about us and those who come after us.

If it be conceded that there is not enough work to give all workers a good eight or nine hour day but that there may be enough to give all workers a six or seven hour day, is it not more desirable to follow the latter course of keeping the greatest number employed, regardless of some increase in the cost of production or some individual discomfort? Such a procedure would be an expedient and an experiment, but the result of such a policy would rapidly become evident. If the necessary volume of production increased, perhaps a half hour or an hour could be added to the working day in preference to the seeking of increased production by reason of increased mechanical efficiency. Such a proposal may sound retrogressive, but is it any worse than the present spectacle of enforced idleness, charity and suffering?

We have many proverbs bearing upon the desirable effects of adversity and necessity, based upon the idea that increased pressure promotes increased thinking. That is the benefit which will come out of the present situation.

If there can be any summarization of these random thoughts on a most vital subject, it may be expressed in the idea that two factors for reducing unemployment are readily applicable and must be used carefully and deliberately. First, every effort must be applied to the development of new products, especially of those which will fall into the classification of necessities and will displace least our present products. Second, there is inevitable a shortening of the number of working hours per week, with less than a corresponding reduction in wages. Of these two factors, the former has already played its greatest part and cannot be relied upon for any decisive future effect. The latter has been used only to a minor extent in the past but will be the real effective agent of the future.

W. J. Brennan Joins Labor Department

Walter J. Brennan, General chairman, Pulp and Paper Section, and safety director at the St. Croix Paper Company, Woodland, Maine, is leaving to take over the directorship of the newly-created Safety Engineering Division, Department of Labor and Industry, Maine, with headquarters in the Capitol Building, Augusta.

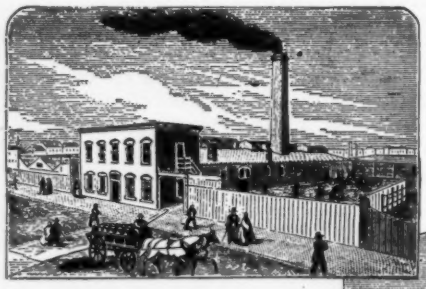
Mr. Brennan has been in the employ of St. Croix nine years and has done pioneer work in safety in that plant. With a perfect safety record for the first six months of 1928 his mill won both the Class B Award and the Major Trophy awarded by *Paper Industry* for the finest and most outstanding performance for the period. In 1929 another championship was won in Class B and in 1930 a Certificate of Merit emblematic of second honors was taken at Pittsburgh.

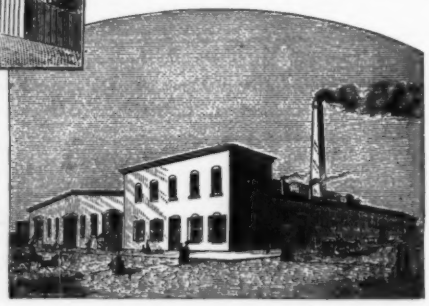
With 170 lost time accidents in 1925, steady progress has been made and marked improvement shown each year, the year just over showing but four injuries totalling 50 days lost time. The frequency rate of the above was 3.48 and severity rate .04, resulting in a national standing among paper and pulp mills of 11th as contrasted to 59th in 1926. Only two mills having more employees bettered the above rating in 1930.

In addition to safety work Mr. Brennan has served as chief chemist and has done considerable public health work and writing for publications, mostly on safety subjects.

Philadelphia Quartz Co. 100 Years Old

On July 21, 1931, the Philadelphia Quartz Company will officially mark its entry into the second century of business. On that same date in 1831, a factory was founded by one Joseph Elkinton in Philadelphia for the manufacturer of soap and candles. For thirty years, these were the chief items of the plant, but in 1861 there was begun the manufacture and sale of a product which was destined to displace the others and to become commercially important. The product was silicate of soda. Although the adhesive value of silicate was already well known and there had been some use of the product for such purpose, it was with the introduction of the corrugated shipping box in the early nineties that a larger demand for silicate as an adhesive was created. Simultaneously came the use of silicate for laminated fibre sheets and wall board.





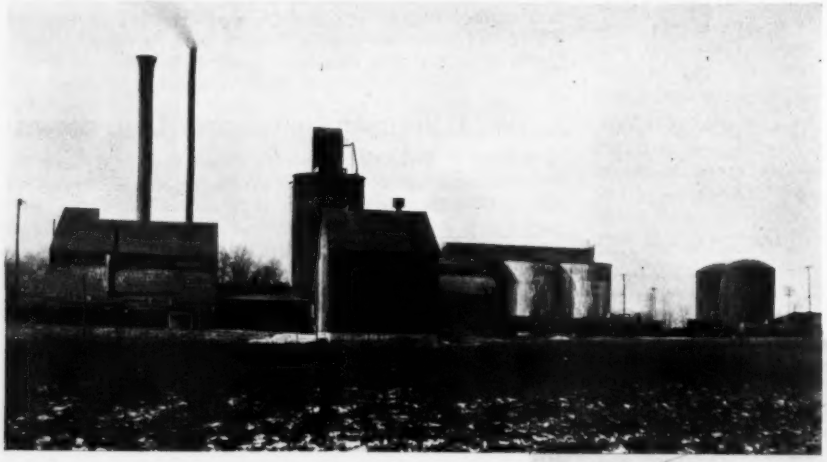
TWO VIEWS OF THE FIRST FACTORY OF THE PHILADELPHIA QUARTZ CO. UNDER THAT NAME, LOCATED AT NINTH AND MIFFLIN STREETS IN PHILADELPHIA

William T. Elkinton, who is the present chairman of the board, joined the company in 1879. Alfred C. Elkinton, now president of the Philadelphia Quartz Company of California, came shortly after. In 1904, the company was incorporated as Philadelphia Quartz Company and the manufacture of soap was discontinued. Since then all efforts have been concentrated on developing the manufacture and uses of silicate of soda. When it was learned that the proportions of ingredients could be varied to produce widely different properties, useful applications for silicate in many other indusries were progressively discovered and this is still going on. The catalog of silicates today includes thirty-three grades, and still new combinations claim study and experiments to meet the needs of ever new conditions in industry. On the threshold of another century, the pioneering spirit still dominates as again the company introduces for the first time in commercial form a new industrial alkali, sodium metasilicate. It is not entirely visionary to expect the developments and improvements in silicates of soda in the second century to equal or surpass those which marked the first.

Silicate of soda is a very low priced commodity. Its place in industry depends upon the refinement of economy both in production and delivery. This dictated the location of plants close to consuming markets. Of these the Philadelphia Quartz Company now has nine, located, after scientific study not only of raw material sources but most favorable delivery conditions at Chester, Pa., Anderson, Ind., Baltimore, Md., Gardenville, N. Y., Kansas City, Kans., Rahway, N. J., St. Louis, Mo., Utica, Ill., Berkeley, California (Philadelphia Quartz Company of California.

The general headquarters of the company are at 121 S. Third street, Philadelphia, where the engineering and chemical staffs are available for consultation with those who have need of facts to help them apply in industry one or more of the numerous commercial grades of silicate of soda.

For one hundred years the written communications of the Philadelphia Quartz Company have borne the quaint salutation, "Respected Friends."



TWO OF THE NINE PHILADELPHIA QUARTZ CO. PLANTS LOCATED AT ANDERSON, IND., BALTIMORE, MD., CHESTER, PA., GARDENVILLE, N. Y., KANSAS CITY, KANS., RAHWAY, N. J., ST. LOUIS, MO., UTICA, ILL. AND BERKELEY, CAL.

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IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JUNE 27, 1931

SUMMARY

Cigarette paper	1985 cs.
Wall paper	5 bls., 3 cs.
Paper hangings	1 cs.
News print	4661 rolls, 28 cs.
Printing paper	18 cs.
Wrapping paper	31 bls.
Packing paper	3 cs.
Tissue paper	58 cs.
Decalcomania paper	9 cs.
Drawing paper	28 rolls, 68 cs.
Filter paper	12 bls., 13 cs.
Surface coated paper	79 cs.
Baryta coated paper	50 cs.
Metal coated paper	57 cs.
Coated paper	4 cs.
Colored paper	8 bls., 8 cs.
Writing paper	1 cs.
Veneer paper	1 cs.
Blotting paper	4 cs.
Filter masse	155 bls.
Paste board	67 cs.
Card board	209 cs.
Card board boxes	5 cs.
Miscellaneous paper	472 rolls, 160 cs.

CIGARETTE PAPER

American Tobacco Co., Collamer, Bordeaux, 350 cs.

De Manduit Paper Corp., Collamer, St. Nazaire, 1214 cs.

Brown & Williamson Tobacco Co., Ile de France, Havre, 5 cs.

American Tobacco Co., Ile de France, Havre, 100 cs.

Brown & Williamson Tobacco Co., Olympic, Southampton, 8 cs.

Henschel Naeve & Co., New York, Hamburg, 22 cs.

Champagne Paper Corp., MacKeesport, Havre, 266 cs.

Max Speigel & Son, Pr. Harrison, Genoa, 7 bls.

P. J. Schweitzer, Pr. Harrison, Marseilles, 20 cs.

WALL PAPER

F. J. Emmerich, Cedric, Liverpool, 2 bls.

Thomas & Pierson, Olympic, Southampton, 1 cs.

R. F. Downing & Co., Olympic, Southampton, 2 cs.

Globe Shipping Co., Milwaukee, Hamburg, 3 bls.

PAPER HANGINGS

Whiting & Patterson Co., Inc., Mauretania, Southampton, 1 cs.

NEWS PRINT

Perkins Goodwin & Co., Columbus, Bremen, 52 rolls.

Perkins Goodwin & Co., Berlin, Bremen, 42 rolls.

Jay Madden Corp., Berlin, Bremen, 585 rolls.

——, Berlin, Bremen, 121 rolls.

Stora Kopperberg Corp., Pripsholm, Gothenburg, 66 rolls.

Parsons & Whittemore, Inc., Gripsholm, Gothenburg, 84 rolls.

International Paper Co., Rygia, Salhousie, 2947 rolls.

Parsons & Whittemore, Inc., Ditmar Koel, Sundsvall, 43 rolls.

Perkins Goodwin & Co., Milwaukee, Hamburg, 178 rolls.

Perkins Goodwin & Co., New York, Hamburg, 409 rolls.

——, New York, Hamburg, 134 rolls, 28 cs.

PRINTING PAPER

P. C. Zuhlke, Belgenland, Antwerp, 3 cs.

C. Steiner, N. Amsterdam, Rotterdam, 1 cs.

American Paper Exports, Inc., American Farmer, London, 3 cs.

J. Henschel & Co., Milwaukee, Hamburg, 11 cs.

WRAPPING PAPER

R. McBratney & Co. Inc., California, Glasgow, 2 bls.

F. C. Strype, Belgenland, Antwerp, 4 cs.

National City Bank, Cabo Villano, Genoa, 25 bls.

PACKING PAPER

Henschel Naeve & Co., Columbus, Bremen, 3 cs.

TISSUE PAPER

American Express Co., Laconia, Liverpool, 1 cs.

F. C. Strype, New York, Hamburg, 11 cs.

F. C. Strype, Conte Grande, Genoa, 2 cs.

P. J. Schweitzer, Pr. Harrison, Genoa, 44 cs.

DECALCOMANIA PAPER

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C. W. Sellers, New York, Hamburg, 2 cs.

DRAWING PAPER

H. Reeve Angel & Co. Inc., Minnekahda, London, 3 cs.

Keuffel & Esser Co., G. Washington, Hamburg, 28 rolls, 65 cs.

FILTER PAPER

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G. Lueders, Olympic, Southampton, 12 bls.

R. U. Delapenha & Co., Pr. Harrison, Marseilles, 2 cs.

SURFACE COATED PAPER

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Herrmann Import Co., New York, Hamburg, 12 cs.

BARYTA COATED PAPER

Globe Shipping Co., Berlin, Bremen, 50 cs.

METAL COATED PAPER

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K. Pauli, New York, Hamburg, 23 cs.

Taub Hummell & Schnall, New York, Hamburg, 5 cs.

Globe Shipping Co., Milwaukee, Hamburg, 17 cs.

COATED PAPER

W. A. Foster & Co., Minnekahda, London, 4 cs.

COLORED PAPER

E. Daiber, Belgenland, Antwerp, 5 cs.

Quality Art Novelty Co., Berlin, Bremen, 8 bls.

S. Gilbert, Berlin, Bremen, 3 cs.

WRITING PAPER

Globe Shipping Co., Pipestone County, Havre, 1 cs.

VENEER PAPER

International F'd'g Co., Pr. Madison, Yokohama, 1 cs.

BLOTTING PAPER

W. V. Dorling Inc., American Farmer, London, 4 cs.

FILTER MASSE

I. Manheimer, Berlin, Bremen, 55 bls.

P. H. Petry & Co., New York, Hamburg, 100 bls.

PASTE BOARD

H. Heide, Inc., Berlin, Bremen, 8 cs.

M. B. Daniels, Ile de France, Havre, 2 cs.

International F'd'g Co., Ile de France, Havre, 52 cs.

Guerlin, Ile de France, Havre, 5 cs.

CARD BOARD

Gevaert Co. of America, Belgenland, Antwerp, 9 cs.

American Express Co., New York, Hamburg, 200 cs.

CARD BOARD BOXES

P. Seguin, Pr. Harrison, Marseilles, 5 cs.

MISCELLANEOUS PAPER

A. Henolcrans, Belgenland, Antwerp, 3 cs.

T. Johnson, Gripsholm, Gothenburg, 5 cs.

P. H. Petry & Co., Gripsholm, Gothenburg, 50 bls., 88 rolls.

The Borregaard Co. Inc., Gripsholm, Gothenburg, 72 bls., 198 rolls, 1 cs.

T. N. Fairbanks, N. Amsterdam, Rotterdam, 1 cs.

Standard Products Corp., Ile de France, Havre, 52 cs.

Japan Paper Co., Ile de France, Havre, 2 cs.

Cherany, Inc., Ile de France, Havre, 2 cs.

Japan Paper Co., Pr. Madison, Kobe, 80 cs.

J. Romer, Sanyo Maru, Kobe, 8 cs.

Parsons & Whittemore, Inc., G. Washington, Hamburg, 186 rolls.

Keller Dorian Paper Co., Pr. Harrison, Marseilles, 6 cs.

RAGS, BAGGINGS, ETC.

G. Schuster, Aconcagua, Havana, 21 bls. rags.

F. Stern, Exilona, Marseilles, 175 bls. rags.

——, Exeter City, Bristol, 211 bls. rags.

E. J. Keller Co. Inc., Pipestone County, ——, 44 bls. rags.

Castle & Overton, Inc., Pipestone County, Havre, 36 bls. rags.

Darmstadt Scott & Courtney, Pipestone County, Havre, 105 bls. jute waste.

Castle & Overton, Inc., Pipestone County, Havre, 31 bls. rags.

Castle & Overton, Inc., Collamer, St. Nazaire, 52 bls. rags.

Chemical Bank & Trust Co., Berlin, Bremen, 39 bls. rags.

Chicago Santiary Rag Co., Tomalva, Rotterdam, 3 bls. rags.

——, Borodino, Hull, 196 bls. rags.

Banco Coml Italiana Trust Co., G. Washington, Hamburg, 41 bls. cotton waste.

Amderutra, G. Washington, Hamburg, 642 bls. rags; 23 bls. cotton waste.

V. Galaup, MacKeesport, Havre, 54 bls. rags; 134 bls. bagging.

Darmstadt Scott & Courtney, Cabo Villano, Barcelona, 48 bls. bagging.

Castle & Overton, Inc., Cabo Villano, Barcelona, 150 bls. bagging.

Banco Coml Italiana Trust Co., Providence, Nice, 64 bls. bagging.

——, Providence, Nice, 56 bls. scrap burlap.

Banco Coml Italiana Trust Co., Anna C, Venice, 425 bls. bagging.

OLD ROPE

Brown Bros. Harriman & Co., Exeter City, Bristol, 58 coils.

Baring Bros. & Co., Borodino, Hull, 110 coils.

Castle & Overton, Inc., Borodino, Hull, 14 coils.

Amderutra, G. Washington, Hamburg, 86 coils.

CASEIN

Kalfleisch Corp., American Legion, B. Ayres, 20 bags.

CHINA CLAY

L. A. Salomon & Bro., Cedric, Liverpool, 75 cks., 460 bags.

WOOD PULP

M. Gottesman & Co. Inc., Gripsholm, Gothenburg, 900 bls. sulphite.

Parsons & Whittemore, Inc., Gripsholm, Gothenburg, 360 bls. sulphate.

Perkins Goodwin & Co., Gripsholm, Gothenburg, 508 bls. sulphate.

Bulkley, Dunton & Co., Gripsholm, ——, 900 bls. wood pulp.

Russell McCandless, Gripsholm, Stockholm, 900 bls. unbleached sulphite; 160 bls. unbleached sulphite, 20 tons.

Johaneson Wales & Sparre, Inc., Ragnhildsholm, Norrsundet, 150 bls. mechanical pulp.

M. Gottesman & Co. Inc., Tomalva, Rotterdam, 275 bls. sulphite, 27 tons.

Polaris Shipping Co., C. Korhg Hawkesbury, N. S., 1265 cords pulp.

Bulkley Dunton & Co., Ditmar, Koel, ——, 6145 bls. wood pulp, 1248 tons.

Johaneson Wales & Sparre, Inc., Ditmar Koel, Svartvika, 450 bls. sulphite.

Joheneson Wales & Sparre, Inc., Ditmar Koel, Soraker, 3125 bls. sulphite.

WOOD PULP

Castle & Overton, Inc., Milwaukee, Hamburg, 275 bls. wood pulp, 55 tons.

Castle & Overton, Inc., New York, Hamburg, 135 bls. wood pulp, 27 tons.

G. S. Kerr Co. Ltd., Dago, Richibucto, N. B., 1200 cords, pulpwood.

WOOD PULP BOARDS

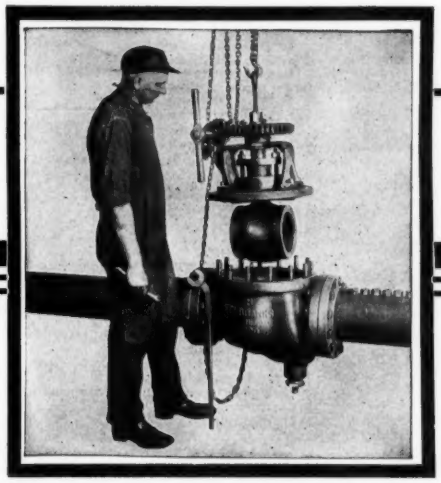
Lagerloef Trading Co., Ragnhildsholm, Kotka, 301 bls.

WOOD FLOUR

State Chemical Co., N. Amsterdam, Rotterdam, 200 bags.

(Continued on page 58)

FAIRBANKS NEW "SPHERO" VALVE



Continuous operation in paper mills demands quick replacements to all equipment.
SPHERO VALVES are easily repaired without detaching the body from the pipe line.
Lever type in sizes ½-in. to 4-in. Gear type in sizes 4-in., 6-in. and 8-in. For 200 Pounds Steam Working Pressure.

Write for Bulletin V-103

THE FAIRBANKS COMPANY

BOSTON NEW YORK PITTSBURGH

Factory: Binghamton, N. Y. *Distributors Everywhere*

Starch

A SIMPLE change in the manufacturing process often results in a pronounced decrease in cost of production.

Paper Mills use Starch for sizing to produce better and stronger sheets with lower cost of manufacture.

Our SPECIAL PAPER brand, furnished in either Pearl or Powdered form for beater-sizing, increases strength of sheet and gives improved finish.

Our FOX HEAD brand for top-sizing is more economical than all glue-size.

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York City

WOOD PULP AGENTS

PRICE & PIERCE, Ltd.,

60 EAST 42nd ST.
NEW YORK

Wood Tanks

are not Corrodible

Half-Round Stuff Chests made of 3-inch Genuine Red Gulf Cypress with heavy Yellow Pine bracing. Built and erected in the Frank Smith Paper Mill at Middletown, Ohio.

The Hauser-Stander Tank Company
Cincinnati Ohio

Wood tanks for every purpose in the paper mill, accurately made and only the best material and workmanship are used in their construction.

Imports of Paper and Paper Stock

(Continued from page 56)

ALBANY IMPORTS

WEEK ENDING JUNE 27, 1931

Amtorg Trading Corp., Minnequa, Leningrad, 2869 cords pulpwood.

BALTIMORE IMPORTS

WEEK ENDING JUNE 27, 1931

——, Collamer, Bordeaux, 25 cs. filter paper.
Union Trading Co., Kerhonkson, Manchester, 8 bls. bagging.
Anglo South American Trust Co., Kerhonkson, Liverpool, 109 coils old rope.
Bulkley Dunton & Co., Ditmar Koel, ——, 8250 bls. wood pulp.
Parsons & Whittemore, Inc., Ditmar Koel, Sundsvall, 135 rolls news print.
M. Gottesman & Co. Inc., Ditmar Koel, Svartvik, 7770 bls. sulphite.
Johaneson Wales & Sparre, Inc., Ditmar Koel, Svartvik, 760 bls. sulphite.
Congoleum Nairn Co., MacKeesport, Havre, 660 bls. rags.

NORFOLK IMPORTS

WEEK ENDING JUNE 27, 1931

Lagerloef Trading Co., Ragnhildsholm, Wiborg, 1300 bls. sulphite; 7041 bls. sulphate; 312 bls. wood pulp boards.
Lagerloef Trading Co., Ragnhildsholm, Kotka, 1664 bls. sulphate; 748 bls. sulphite; 2700 bls. mechanical pulp
Old Dominion Paper Co. Inc., Ragnhildsholm, Kotka, 73 rolls news print.
Whitaker Paper Co., Ragnhildsholm, Kotka, 141 rolls news print.
——, Kerhonkson, Manchester, 344 bls. bagging.

NEW ORLEANS IMPORTS

WEEK ENDING JUNE 27, 1931

Whitney National Bank, Ditmar Koel, Sundsvall, 756 rolls news print.
Illinois Central R. R. Co., Ditmar Koel, Sundsvall, 126 rolls news print.
Parsons & Whittemore, Inc., Ditmar Koel, Sundsvall, 1460 rolls news print.

PHILADELPHIA IMPORTS

WEEK ENDING JUNE 27, 1931

——, Exeter City, Bristol, 151 coils old rope.
Castle & Overton, Inc., Collamer, Bordeaux, 431 bls. rags.
H. G. Lichtenstein, Collamer, Bordeaux, 328 bls. rags.
Castle & Overton, Inc., Collamer, St. Nazaire, 68 bls. rags.
J. W. Hampton Jr. & Co., Ragnhildsholm, Norrsundet, 25 rolls paper.
Lagerloef Trading Co., Ragnhildsholm, Wiborg, 8030 bls. sulphite.
Lancaster News, Ragnhildsholm, Kotka, 50 rolls news print.
J. W. Hampton, Jr. & Co., Ragnhildsholm, Kotka, 160 rolls news print.
Lagerloef Trading Co., Ragnhildsholm, Kotka, 901 rolls wood pulp boards.
——, Anna C, Bari, 458 bls. rags.
E. J. Keller Co. Inc., Harburg, ——, 738 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JUNE 27, 1931

Atterbury Bros. Inc., Sardinian Prince, B.Ayres, 417 bags casein, 25020 kilos.
Chase National Bank, Pipestone County, Dunkirk, 66 bls. paste.
Judson Freight F'd'g Co., Pipestone County, Havre, 1 cs. writing paper.
Irving Trust Co., Pipestone County, Havre, 81 bls. paper stock.
Hollingsworth & Vose Co., Pipestone County, Havre, 49 bls. bagging.
Castle & Overton, Inc., Pipestone County, Havre, 69 bls. rags.
G. F. Malcolm, Laconia, Liverpool, 17 cs. tissue paper.
International Paper Co., Rygia, Dalhousie, 2113 rolls news print.
Atkinson Haserick Co., Pr. Harrison, Genoa, 3 cs. paper.

Recent Decisions on Freight Rates

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 1, 1931—The proposed rates on scrap or waste paper, in carloads, between points in southwestern territory and between points in southwestern territory and points in eastern defined territories have not been found justified by the Interstate Commerce Commission in an opinion just rendered in connection with its own investigation. The suspended schedules have been ordered canceled without prejudice to the filing of new schedules in accordance with the conclusions in this opinion. The proceeding has been discontinued.

The Commission has found that rates on pulpwood, in carloads, from points in Canada to destinations in New York are not unreasonable and the complaint of J. Fred Amsden and related cases against the Canadian Northern Railways are dismissed.

The proposed increased rate on news print paper, in carloads, from Thorold, Ont., to Chicago have been found justified in an investigation of the Commission. The order of suspension has been vacated and the proceeding discontinued.

William N. Smith Dead

William N. Smith, who served three terms as Mayor of Bogota, N. J., died June 22 at his home, 577 Summitt Avenue, Hackensack. He had been ill with cancer for a year. His age was 67 years. Mr. Smith was president and treasurer of the Bogota Paper and Board Company, which he organized thirty-five years ago, and president of the Bogota National Bank and of the Bogota Building and Loan Association.

He was born in Buffalo and started his business career in Colchester, Conn., moving to Bogota in 1896. He became active in church work there, and was a founder of the Smith Community Church in the neighboring community of Teaneck. He was also a deacon of the Second Reformed Church of Hackensack. A widow, Edith Welsh Smith, survives.

Completing Pulpwood Operations

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., June 29, 1931—The task of hauling nearly 30,000 cords of pulpwood from the Hudson River to the pond north of Feeder Dam prior to transportation to the mills of Finch, Pruyn & Company is nearing completion after several weeks. A large force of lumberjacks have been employed on the drive this season which started in the region known as Lake Henderson in the Adirondacks. The logs were driven over one hundred miles during the course of the drive and are to be used in the manufacture of news print paper.

The logs were cut during the summer of last year and the following winter were hauled to the ice on Lake Henderson so as to be in readiness for the spring freshet. During the drive this spring the main body of lumberjacks have followed the logs in scows although a few have pursued the old-fashioned method of riding them in order to dislodge those logs that become stranded in shallow spots, threatening to create a jam. Log drives in the Hudson are not conducted on the extensive scale of a few years ago and many of the paper mills have turned to the imported pulpwood for their needs.

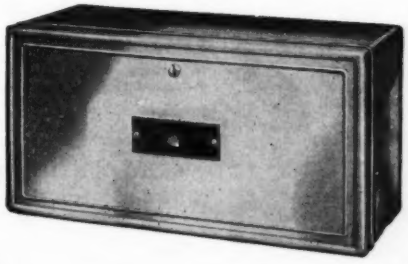
The drive on the Racquette River in the vicinity of Potsdam has also progressed well this year with heavy spring rains aiding in bringing the pulpwood down to the booms below that village. About forty lumberjacks have been employed on this project and it is said that the pulpwood will eventually be used at the Unionville mills of the Racquette River Paper Company.

J. H. Baker Goes with Northern Paper Mills

J. Herbert Baker, who recently resigned his position as salesman for the Bird Machine Company, of South Walpole, Mass., in the Wisconsin and Minnesota territories has accepted a position with the Northern Paper Mills of Green Bay, Wis. Mr. Baker has been with the Bird Machine Company for several years, during which time he made many friends throughout the industry.

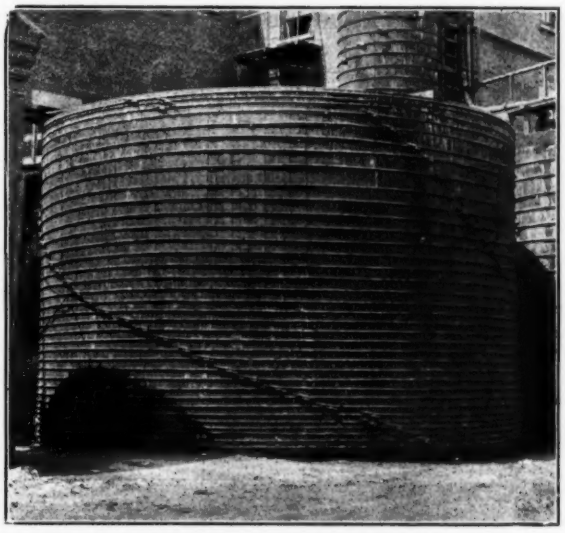
GRIFFITH-HOPE

Dispensing Cabinets
AND
Fixtures
ARE
The STANDARD of the PAPER TRADE
For Towels, Toilet, Napkins, Etc.



GRIFFITH-HOPE CO., West Allis, Wisc.

WOOD TANKS TILE



Blow Pit and Vomit Stack at Marathon Paper Company Mill

NO TANK is too large nor none too small for our tank-making equipment and stocks. We cater to the needs of the paper industry. Blow Pits, Vomit Stacks, Stock Tanks, Acid Storage Tanks, Stuff Chests, Agitators, etc. See our Condensed Catalog in Paper and Pulp Mill Catalog. Ask us about our Glazed Tile Tanks.

KALAMAZOO TANK AND SILO CO.
KALAMAZOO, MICHIGAN
Tank Builders Since 1867

West Virginia Pulp and Paper Company

Manufacturers of

SUPERCALENDERED
and
MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing Cover and Music Paper, High Grade Coated Book, Index Bristol, Post Card, Kraft and Label Papers

also

Bleached Spruce Sulphite and Soda Kraft Pulp

230 Park Ave. New York — 35 East Wacker Drive Chicago
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Sixth and Chestnut Sts., Philadelphia, Pa.

The uses of Liquid Chlorine

are rapidly expanding, so we are improving our facilities, and are prepared to ship promptly in Tank Cars, Multi-Unit Tank Cars (1-ton containers), or Cylinders (150 lbs. or 100 lbs.) from either Philadelphia, Pa., Wyandotte, Mich., Menominee, Mich., or Tacoma, Wash.

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Natrona, Pa. Wyandotte, Mich.
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Tacoma, Wash.

CLINTON STARCHES

Special Grades for Beater and Top Sizing

Manufactured by

CLINTON CORN SYRUP REFINING COMPANY
CLINTON, IOWA

QUALITY SERVICE

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 1, 1931.

The position of the local paper market is practically unchanged. Demand for the various standard grades of paper is only moderately active, with the possible exception of summer specialties, which are moving in greater volume now that the warm weather is here. Prices are holding to formerly quoted levels, in most instances.

No further changes have been reported in the news print situation. Production is being maintained at approximately 62 per cent of rated capacity in the United States and Canada and offerings are sufficient to take care of current requirements, although accumulations at the mills are not excessive. Prices are holding to schedule.

Trading in the paper board market is mainly along seasonal lines. Box board production is being maintained in adequate volume to meet the prevailing demand. Prices generally remain unchanged. The outlook for the fine paper market is more promising than of late, judging from the number of inquiries being received. Wrapping paper is moving into consumption in a normal manner for the season.

Mechanical Pulp

The ground wood market is slightly easier. Both imported and domestic mechanical pulp are only in limited demand at present. Prices are somewhat weaker. No. 1 imported moist ground wood is now quoted at from $26 to $30, on dock, Atlantic ports, while No. 1 dry is offered at from $27 to $30. Domestic mechanical pulp is practically unchanged.

Chemical Pulp

Steadiness prevails in the chemical pulp market. While most of the grades of imported and domestic chemical pulp continue steady and unchanged, imported kraft pulp is decidedly firmer. No. 1 imported kraft pulp is now quoted at from $1.45 to $1.70, on dock, Atlantic ports; while No. 2 imported kraft pulp is selling at from $1.35 to $1.50

Old Rope and Bagging

Paper mill demand for old rope is restricted at present. Little interest is being displayed in either domestic or foreign old manila rope. Small mixed rope is dull. Prices are holding up fairly well. The bagging market is exhibiting a steady trend. Scrap bagging is in excellent request, although gunny bagging is less active.

Rags

Some improvement was noticed in the domestic rag market. While the prevailing demand for cotton cuttings is light, the outlook is considered brighter, in many quarters. Roofing grades continue to go forward in good volume. Mixed rags are rather quiet. The imported rag market is dull and irregular.

Waste Paper

Board mills continue to show great interest in some of the lower grades of paper stock, particularly in No. 1 mixed paper, which is firmer, due to scarcity of offerings. Old kraft machine compressed bales are in good request. Ledger stock is exhibiting a strong undertone. Other grades of waste paper are generally steady and unchanged.

Twine

Conditions in the local twine market are fairly satisfactory. Sales of the various grades are about equal to the volume transacted a year ago. Supplies are going forward into consumption at a steady pace. Although competition continues keen, prices are generally holding to formerly quoted levels.

Standards for Odd Bags

The Kraft Institute, of 122 East 42nd Street, New York, and the odd bag manufacturers, have adopted a list of Standards for Odd Bags, which has just been published. This should undoubtedly prove a remarkable step forward in the merchandising of odd bags, as the standards announced embody sound business principles and meet the normal requirements of paper merchants' stock.

In accordance with the familiar and useful procedure of the Bureau of Standards of U. S. Department of Commerce in its effort towards standardization, a committee was appointed to study the situation on odd and special bags. As a result of its study the committee found that in many branches of the bag industry there have existed for many years, uniform base lists, but that such has not been the case with respect to odd bags, with the necessary result that confusion and inconvenience is found prevailing.

Study was also made of the desirability of standardizing the items with respect to specifications for sizes, basis weights, packing, width of rolls, etc. The committee was of the opinion that such standardization tended toward clarification, simplification, and economy for the benefit of every branch of the industry from manufacturer to user.

Paper Men in New Talc Concern

GOUVERNEUR, N. Y., June 29, 1931—A number of prominent paper mill men of Northern New York are the principal stockholders in the formation of a new concern which is to be known as the Adirondack Mining Company. C. H. Sprague, president of the new concern, has been interested in various projects in this section and he now controls several hundred acres of talc deposits in the towns of Fowler and Gouverneur, including the Newton talc mine adjoining the property of the International Pulp Company. Plans call for the taking over of this property by the new concern for development purposes. Among the other directors of the company are J. J. Wallace, superintendent of the International Pulp Company, and Mark S. Wilder, for many years prominent in the paper and power industry of this section. While the new company's interests are now confined mostly in St. Lawrence county it was learned that plans call for branching out into other fields in the near future.

TRIUNE
AND
MULTIPLE PLY DRYER FELTS

Serve every Felt Purpose in an efficient and satisfactory way.

ENGLISH or BAKER WOVEN

Made in three, four, five and six ply—60" to 214" wide.

FITCHBURG DUCK MILLS
FITCHBURG, MASS.

For 87 Years Makers of Fine Faced Felts For Papermakers

1864 **1931**

"EXCELSIOR" FELTS
for every grade of
PULP AND PAPER

We continue to maintain at the top the quality of Excelsior Felts, as we have done since we, as pioneers, made the first endless paper machine felts manufactured in America.

Seamless felts for fast running.
Satin Style felts for finish.
Special felts to meet every condition.
Send us your felt problems.

KNOX WOOLEN COMPANY
CAMDEN, MAINE

SOLD BY
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75-77 Duane St., N. Y., and direct

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1931 EDITION

City Addresses of Mills and Mill Supply Houses
Classified List of Paper Mill Products
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10 East 39 Street ~ New York N.Y.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, July 1, 1931.

BLANC FIXE.—The position of the blanc fixe market is practically unchanged. Prices are holding to schedule. The pulp is quoted at from $42.50 to $45 per ton; while the powder is selling at from 3¾ cents to 3½ cents per pound, in barrels, at works.

BLEACHING POWDER.—Supplies of bleaching powder are going forward in fairly heavy volume. Trading has fallen off slightly, due mainly to seasonal causes. Prices are unchanged. Bleaching powder is quoted at from $2 to $2.35 per 100 pounds, in drums, at works.

CASEIN.—The casein market continues weak. Domestic standard ground is quoted at 6¾ cents and finely ground at 8½ cents per pound. Argentine standard ground is selling at 8½ cents and finely ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—The caustic soda market is rather quiet. Prices are holding to schedule. Solid caustic soda is quoted at from $2.50 to $2.55; while the flake and the ground are selilng at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY.—Conditions in the china clay market are fairly satisfactory. Prices remain steady and unchanged. Imported china clay is quoted at from $13 to $21 per ton; while domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE.—Trading in the chlorine market is moderately active. Contract shipments are moving in good volume. Prices are generally holding to schedule. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in large drums, at works.

ROSIN.—The rosin market is steadier. Grades of gum rosin used in the paper mills are quoted at from $5.55 to $5.65 per 280 pounds, in barrels, at yards. Wood rosin is selling at $4.30 per 280 pounds, in barrels, car lot quantities, at southern shipping points.

SALT CAKE.—Offerings of salt cake are sufficient to take care of current requirements. The contract movement is normal. Salt cake is quoted at from $16 to $17; German salt cake at from $15.50 to $16; and chrome salt cake at from $14 to 15 per ton, in bulk, at works.

SODA ASH.—The soda ash market is fairly steady for the time of the year. Shipments against contract are moving with regularity. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1; in bags, $1.15; and in barrels, $1.38.

STARCH.—Demand for starch from the paper mills is being maintained in a satisfactory manner. The contract movement is well up to average. Prices remain unchanged. Special paper making starch is quoted at $2.67, in bags; and at $2.94 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is rather irregular. Prices, however, are holding to schedule. Commercial grades are quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—Steadiness prevails in the sulphur market. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton for any smaller quantity over that period. On spot and nearby car loads, the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market during the past week was along routine lines. Prices are unchanged. Domestic talc is quoted at from $16 to $18 per ton, in bulk; while imported talc is selling at from $18 to $22 per ton, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	6.75	@53.25
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine sized	6.75	@11.00
Book, Cased—		
S. & S. C.	5.25	@ —
M. F.	5.00	@ —
Coated and Enamel	6.75	@10.25
Lithograph	7.25	@11.75
Tissues—Per Ream—		
White No. 1	.65	@ .70
Anti-Tarnish M. G. only	.65	@ .70
Colored	.70	@ .90
White No. 2	.55	@ .60
Kraft	.65	@ .70
Manila	.55	@ .60
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.00	@ 5.25
No. 2 Wood	3.50	@ 4.00
Butchers	3.37½	@ —
Fibre Papers—		
No. 1 Fibre	4.25	@ 5.50
No. 2 Fibre	4.00	@ 4.75
Common Bogus	1.50	@ 3.00
Screenings	2.00	@ 3.00
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs., No. 1	.09¾	@ —
No. 2	.11¼	@ —
Bleached, basis 20 lbs.	.11¾	@ —

(Delivered New York)

News, per ton—		
Rolls, contract	57.00	@ —
Rolls, spot	57.00	@ —
Sheets	62.00	@ —
Side Runs	42.00	@46.00
Kraft—		
No. 1 Domestic	4.25	@ 5.30
No. 2 Domestic	3.50	@ 4.00
Southern	3.50	@ 4.00
Imported	6.00	@ 7.00
Boards—per ton—		
News	30.00	@32.50
Straw	40.00	@45.00
Chip	27.50	@30.00
Binders' Boards	65.00	@70.00
Standard 85 Test Liner	32.50	@35.00
Sgl. Mla. Ll. Chip	40.00	@42.50

(F. o. b. Mill)

Wood Pulp Boards	70.00	@80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—		
Moist	26.00	@30.00
Dry	27.00	@30.00

(F. o. b. Mill)

No. 1 Domestic	25.00	@30.00

Chemical Pulp

(On Dock, Atlantic Ports),

Sulphite (Imported)—		
Bleached	2.50	@ 3.50
Easy Bleaching	2.15	@ 2.35
No. 1 strong unbleached	1.90	@ 2.35
Mitscherlich unbleached	2.05	@ 2.25
No. 2 strong unbleached	1.80	@ 2.00
No. 1 Kraft	1.45	@ 1.70
No. 2 Kraft	1.35	@ 1.50
Sulphate—		
Bleached	2.75	@ 3.25

(F. o. b. Pulp Mill)

Sulphite (Domestic)—		
Bleached	2.25	@ 4.75
Easy Bleaching	2.55	@ 2.75
News	1.80	@ 2.50
Mitscherlich	2.40	@ 3.00
Kraft (Domestic)	1.60	@ 2.75

(Delivered Paper Mills)

Soda Bleached	3.00	@ —

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	7.00	@ 7.45
New White, No. 2	6.00	@ 6.50
Silesias No. 1	5.25	@ 5.50
New Unbleached	7.25	@ 7.75
New Blue Prints	4.00	@ 4.50
New Soft Blacks	3.50	@ 4.00
Blue Overall	5.25	@ 5.50
Fancy	3.50	@ 3.75
Washables	3.00	@ 3.25
Mixed Khaki Cuttings	3.75	@ 4.25
Pink Corset Cuttings	5.50	@ 6.00
O. D. Khaki Cuttings	4.75	@ 5.00
Men's Corduroy	3.00	@ 3.50
New Mixed Blacks	3.00	@ 3.25

Old Rags

White, No. 1—		
Repacked	5.25	@ 5.75
Miscellaneous	4.25	@ 4.75
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.30	@ 2.50
St. Soiled, White	1.50	@ 1.75
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.65	@ 1.85
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.25	@ 1.30
No. 1	1.25	@ 1.30
No. 2	.90	@ 1.00
No. 3	.70	@ .80
No. 4	.65	@ .70
No. 5A	.50	@ .60

Foreign Rags

New Rags

New Dark Cuttings	2.00	@ 2.15
New Mixed Cuttings	2.10	@ 2.40
New Light Silesias	5.00	@ 5.38
Light Flannelettes	5.00	@ 5.25
Unbleached Cuttings	7.00	@ 7.50
New White Cuttings	6.50	@ 6.75
New Light Oxfords	5.00	@ 5.50
New Light Prints	3.50	@ 3.75

Old Rags

No. 1 White Linens	6.50	@ 6.75
No. 2 White Linens	5.75	@ 5.25
No. 3 White Linens	4.00	@ 4.50
No. 4 White Linens	2.50	@ 3.00
No. 1 White Cotton	4.50	@ 5.00
No. 2 White Cotton	3.50	@ 4.25
No. 3 White Cotton	2.50	@ 3.25
No. 4 White Cotton	1.50	@ 1.75
Extra Light Prints	2.50	@ 2.75
Ord. Light Prints	2.00	@ 2.25
Med. Light Prints	1.65	@ 1.75
Dutch Blue Cottons	1.80	@ 1.90
French Blue Linens	2.50	@ 2.60
German Blue Linens	2.25	@ 2.40
German Blue Cottons	1.75	@ 1.85
Checks and Blues	1.60	@ 1.75
Lindsay Garments	1.10	@ 1.20
Dark Cottons	.75	@ .80
Old Shopperies	.70	@ .75
New Shopperies	.70	@ .75
French Blues	1.80	@ 1.90

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.65	@ 1.80
Domestic	1.65	@ 1.80
Wool Tares, light	1.25	@ 1.30
Wool Tares, heavy	1.25	@ 1.30
Bright Bagging	1.20	@ 1.30
Small Mixed Rope	.90	@ 1.00
Manila Rope—		
Foreign	2.00	@ 2.15
Domestic	2.10	@ 2.25
New Burlap Cut	1.80	@ 1.90
Hessian Jute Threads—		
Foreign	2.60	@ 2.75
Domestic	2.80	@ 3.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, white, No. 1	2.75	@ 2.85
Hard, white, No. 2	2.20	@ 2.30
Soft, white, No. 1	2.20	@ 2.30
White envelope cuttings	2.60	@ 2.70
Flat Stock—		
Stitchless	.85	@ .95
Overissue Mag	.85	@ .95
Solid Flat Book	.75	@ .85
Crumpled No. 1	.60	@ .65
Solid Book Ledger	1.75	@ 1.85
Ledger Stock	.80	@ .85
New B. B. Chips	.20	@ .30
Manilas—		
New Env. Cut	2.00	@ 2.20
New Cuttings	1.50	@ 1.65
Extra No. 1 old	1.20	@ 1.30
Print	.50	@ .60
Bogus Wrapper	.50	@ .60
Container	.25	@ .30
Old Kraft Machine—		
Compressed bales	1.10	@ 1.20
News—		
No. 1 White News	1.60	@ 1.70
Strictly Overissue	.40	@ .45
Strictly Folded	.30	@ .35
No. 1 Mixed Paper	.20	@ .25
Common Paper		Nominal

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Twines

(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.30	@	.32
No. 1	.20	@	.22
No. 2	.19	@	.20
No. 3	.17	@	.18
A. Italian, 18 basis	.36	@	.37
Finished Jute—			
Dark, 18 basis	.18	@	.20
Light, 18 basis	.20	@	.22
Jute Wrapping, 3-6 Ply—			
No. 1	.13	@	—
No. 2	.11	@	—
Tube Rop —			
4-ply and larger	.09	@	—
Fine Tube Rope—			
4-ply	.11	@	—
3-ply	.12	@	—
2-ply	.13	@	—
Lace Makers Twine			
Balls	.07	@	—
Box Twine, 2-3 ply	.07	@	.08
Jute Rope	.09	@	.10
Amer. Hemp, 6	.27	@	.29
Java Sisal			
No. 1 Basis	.10	@	—
No. 2 Basis	.09	@	—
New Zealand Sisal	.10	@	—
Sisal Lath Yarn—			
No. 1	.12	@	.14
No. 2	.10	@	.12
Manila Twine	.21	@	.22

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Wafer Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	5.00	@	5.50
Southern Kraft	3.75	@	4.00
No. 2 Kraft	3.75	@	4.00
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.07	@	.07½
White Tissue	.07¼	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	62.00	@	—
Sheets	67.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.35	@	2.40
White Env. Cuttings	—	@	—
No. 1 Soft Shavings	2.10	@	2.15
Ledger & Writings	.70	@	.75
Solid Books	.75	@	.80
Blanks	1.60	@	1.65
Krafts	1.25	@	1.35
New Kraft Cuts	1.35	@	1.45
Manila Env. Cuts	1.50	@	1.55
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.35	@	.40
No. 2	.30	@	.35
Mixed Papers—			
No. 1	.28	@	.30
No. 2	.20	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.05	@	.40
Ledgers	.07	@	.40
Writings—			
Superfine	.12	@	.18
Extra fine	.16	@	.22
Fine	.15	@	.26
Fine, No. 2	.13½	@	.25
Fine, No. 3	.08½	@	.20
Book, M. F.	.05	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.08	@	.16
Coated Lithograph	.07	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.07	@	.09
Manila Sul., No. 1	.03¼	@	.05½
Manila No. 2	.03	@	.04
No. 1 Kraft	.05¼	@	.06
No. 2 Kraft	.03½	@	.04
Southern Kraft No. 1	—	@	.03¾
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04
(Delivered Philadelphia)			
News Print Rolls	62.00	@	—
Straw Board	50.00	@	—
News Board	32.50	@	—
Chip Board	30.00	@	—
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	75.00	@	—
No. 2, per ton	68.00	@	—
Carload lots	66.00	@	70.00
Tarred Felts—			
Regular	55.50	@	57.00
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.07
New White, No. 2.	.05½	@	.06
Light Silesias	.05	@	.05½
Silesias, No. 1	.06	@	.08
Black Silesias, soft.	.05	@	—
New Unbleached	.06½	@	.07
Washable, No. 1	.03	@	.03½
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02	@	.02½
New Blue	.02	@	.02½
Fancy	.03½	@	—
New Black Soft	.03	@	.03½
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed.	.03	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.50	@	3.00
M. G.	4.50	@	—
Thirds and Blues—			
Miscellaneous	1.25	@	1.50
Repacked	1.75	@	2.00
Black Stockings (Export)	3.80	@	4.00
Roofing Stock—			
Foreign No. 1	1.15	@	1.25
Repacked	.80	@	.90

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	2.50	@	2.75
Sisal Rope	1.25	@	1.50
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.50	@	2.60
No. 2 Hard White	2.10	@	2.25
No. 1 Soft White	2.15	@	2.25
No. 2 Soft White	1.35	@	1.50
No. 1 Mixed	.80	@	.90
No. 2 Mixed	.55	@	.65
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.05	@	1.25
No. 1 Books, heavy	1.00	@	1.15
No. 2 Books, light	.90	@	.95
No. 1 New Manila	2.15	@	2.30
No. 1 Old Manila	1.40	@	1.50
Print Manila	.50	@	.60
Container Manila	.45	@	.50
Old Kraft	1.15	@	1.20
Common Paper	.25	@	.30
No. 1 Mixed Paper	.25	@	.30
Straw Board, Chip	.35	@	.40
Binders Board, Chip	.35	@	.45
Corrugated Board	.50	@	.60
Overissue News	.40	@	.45
Old Newspaper	.25	@	.30

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.12½
Rag Content	.15	@	.30
All Rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09¼	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	.03½	@	.04¼
(F. o. b. Boston)			
Southern Kraft	.03½	@	.03¾
(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)			
Common Bogus	.02	@	.02¾
(Delivered New England points)			
News Print, rolls	61.50	@	—
Straw Board, rolls	.009	—	@52.50
Straw Board in Sheets, basis 35s to 70s	—		@50.00
Filled News Board	32.50	@	—
Chip Board	27.50	@	—
Chip Board (Creasing)	32.50	@	—
Single Manila Lined Chip	40.00		@45.00
Single White, Patent Coated News Board—			
Binder, No. 1	60.00		@75.00
Binder, No. 2	55.00		@65.00
Wood Pulp Board	75.00		@80.00
Binder Boards	67.50		@75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	3.25	@	3.75
No. 2 Hard White	2.60	@	2.90
No. 1 Soft White	2.25	@	2.40
No. 2 Mixed	.60	@	.65
No. 1 Mixed	.90	@	1.00
Solid Ledger Books	1.75	@	2.00
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.75	@	.90
No. 1 Books, light	.55	@	.70
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	—	@	1.00
White Blank News	1.50	@	1.60
Kraft No. 1	—	@	1.10
Manila	.80	@	.90
No. 1 Mixed Paper	—	@	.16
Overissue News	—	@	.40
Old Newspapers	.25	@	.30
Box Board, Chip	.16	@	.20
Corrugated Boxes	.35	@	.45

Bagging

(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.80
Domestic	1.60	@	1.70
Manila Rope—			
Foreign	—	@	2.00
Domestic	2.50	@	—
Transmission Rope	1.75	@	—
Mixed Strings	—	@	.70
Jute Rope	1.25	@	—
Jute Carpet Threads	.90	@	1.05
Bleachery Burlap	—	@	3.25
No. 1 Scrap Burlap	—	@	1.25
Scrap Sisal	1.40	@	1.50
Scrap Sisal for shredding	1.50	@	1.60
Wool Tares, heavy	1.30	@	—
New Burlap Cutting	1.75	@	2.00
Australian Pouches	2.50	@	—
Heavy Baling Bagging	—	@	1.75
Paper Mill Bagging	.95	@	1.10
Bagging No. 2	.50	@	—
No. 1 Burlap	—	@	3.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1.	.06½	@	.07
New White No. 2.	—	@	.06
Silesias No. 1	.06	@	.06¼
New Black Silesias	.02½	@	.02¾
New Unbleached	—	@	.08
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades—			
Blue Overalls	.05	@	.06
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.50	@	2.75
Thirds and Blues—			
Repacked	1.60	@	1.80
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	.75	@	.80
No. 2	.65	@	.70
No. 3	.50	@	.60

Foreign Rags

(F. o. b. Boston)

Dark Cottons	—	@	.75
New No. 1 White Shirt Cuttings	7.75	@	8.00
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.65	@	1.75
Old Linsey Garments	.85	@	.95

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	08½	@	—
No. 1 Colored	.11¼	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (carloads)	6.65	@	—
No. 3 M. F. (carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(Delivered Toronto)

News, per ton—			
Rolls (contract)	61.50	@	62.00
Sheets	67.00	@	—

Pulp

(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	70.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.80	@	—
Soft White	2.60	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.10	@	—
Light and Crumpled Book Stock	1.20	@	—
Ledgers and Writings	—	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	.80	@	—
Kraft	1.90	@	—
News and Scrap—			
Strictly Overissue	.70	@	—
Strictly Folded	.70	@	—
No. 1 Mixed Paper	.60	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼

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New York,
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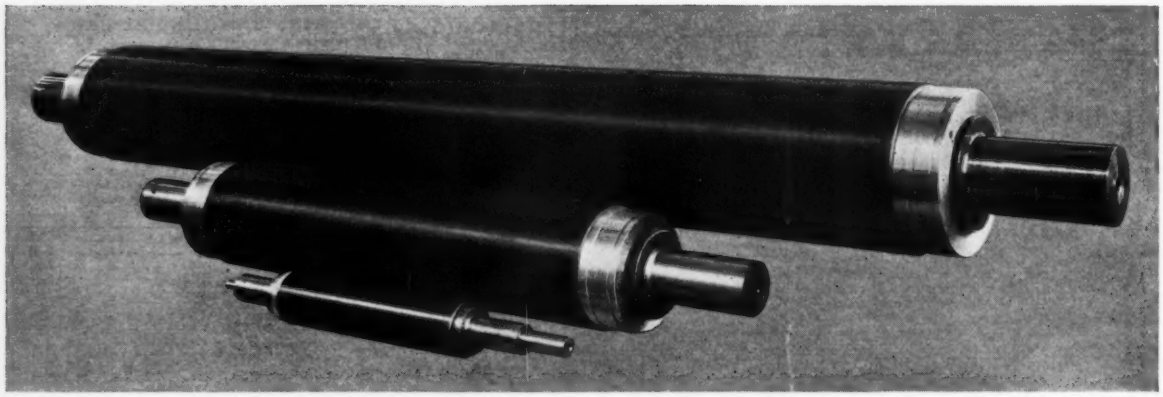

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